UNITED STATES ARMY

AVIATION DIGEST

MAY/JUNE 1990

GRAND OPENING

26 MAY 1990

Army Aviation MUSEUM

Professional Bulletin 1-90-3

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AVIATION DIGEST

PROFESSIONAL BULLETIN

1-90-3 • MAY/JUNE 1990

1 **Army Aviation: A Relevant Force for the Future,** MG Rudolph Ostovich III

2 **Grand Opening, Army Aviation Museum,** Mr. Ted Walls

8 **The Army Ground Forces and the Helicopter, 1941 to 1945,** Dr. Howard K. Butler

14 **In Relative Obscurity,** Mr. Edward J. Bavaro

22 **Aviation Medicine Report: Aviators and Alcohol: A Personal Experience,** MAJ Kevin T. Mason, M.D., M.P.H.

26 **Helicopter Operations in a Microburst Environment**

32 **Disaster at Ft. Hood,** CPT Thomas J. O'Brien

38 **ATC Focus: Special Requirements for Flight Inspection Aircraft,** MSG Thomas Guthrie

40 **Personnel Notes: Army/American Council on Education Registry Transcript; Officer Personnel Management Directorate (OPMD); Reconfiguration of Reserve Component Aviation Officer Advanced Course (RC-AVOAC)**

42 **Aviation Logistics: USAALS: A Brief History,** Ms. Jean Cerve

47 **Flight Safety Parts Program Update,** Mr. Timothy C. Rickmeyer

52 **AVSCOM: The Army Aviation National Maintenance Point, A Historical Brief,** COL Gary D. Johnson

55 **World Helicopter Championship, 1970 to 1989,** Mrs. Wille E. Huntley

56 **The 1989 World Helicopter Champions,** CW4 E. Daniel Kingsley

Back Cover: **USAASO SEZ: Direct User Access Terminal Service,** Mr. Terry L. Van Steenbergen

About the Cover: **A Dream Come True**—The new U.S. Army Aviation Museum, Ft. Rucker, AL, beautifully completed on the outside with insulated limestone-colored paneling, proudly shows off Army Aviation history on the inside.

The grand opening 26 May served as a special invitation for everyone to see what's inside.

The museum's three floors and 87,000 square feet include aircraft galleries, exhibits, theater, library, gift shop, simulators, Vietnam era diorama and the story line of Army Aviation depicted by paintings, photographs and uniforms. Story begins on page 2.

Major General Rudolph Ostovich III
Commander, U.S. Army Aviation Center

Patricia S. Kitchell
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Major General Rudolph Ostovich III
Chief, Army Aviation Branch

Army Aviation: *A Relevant Force for the Future*

THE WORLD IS obviously experiencing one of the most dynamic periods of this century. Not since the end of World War II has so much fundamental change taken place in the political-military situation across the global landscape. Now is the time to take stock of where we are and where we are headed.

A clear set of requirements for the Army was recently discussed by General Colin L. Powell, Chairman of the Joint Chiefs of Staff, at a military doctrine seminar in Vienna. General Powell showed how the U.S. Defense Program and our nation's role in the North Atlantic Treaty Organization have followed four constant principles since the end of World War II.

First, our defense structure is not postured for war, but rather to deter aggression against the United States and our allies. **Second**, we have demonstrated that when challenged we will respond, with force, if necessary, to defend ourselves, our allies, our interests and our values. **Third**, we have demonstrated our resolve to honor our commitments to collective security in partnership with other nations who share our values. And **fourth**, we will continue to ensure the readiness of our land forces.

With these requirements in mind, let's focus on our branch and address how Army Aviation can contribute to the Army and national defense. As we observe the defense share of the budget shrinking and diminution of the Soviet threat, we also find ourselves facing emerging threats, such as drug wars and continued unrest in Latin America, Southwest Asia and the Middle East. Additionally, we continue to support civil needs, such as disaster relief and emergency assistance.

How will all this affect our branch? Certainly these fundamental changes will shape and transform traditional concepts as well as cause us to review our aviation programs. Fortunately, we find that over the past decade, we have undergone extensive alterations that have already prepared our branch well for the future. Our branch and our Army are the best trained, most ready peacetime force in our nation's history. Tremendous quality is evident in our soldiers, doctrine, force structure, training, materiel and leaders. All of this is no accident. The results were produced by uncompromising adherence to what General Carl E. Vuono, Army Chief of Staff, calls the *six fundamental imperatives that guide the Army* today and serve as a beacon for the future.

These imperatives provide our branch with the azimuth to effectively perform our mission. I plan to discuss them in detail, one at a time, in the follow-on issues of the *Aviation Digest*. For now, a brief explanation will suffice. *Quality*: attract and retain high quality soldiers and civilians for our Army. *Doctrine*: maintain a forward-looking warfighting doctrine. *Force Structure*: maintain the appropriate mix of heavy, light and special operations forces in our Active and Reserve Components. *Training*: conduct tough, realistic training. *Modernization*: modernize our warfighting capability. *Leader Development*: develop Army leaders for the future.

General Vuono's imperatives are our roadmap for the future. The Army's role, now more than ever, lends credence to our share of responsibility within the Department of Defense. Our Army is well-balanced, deployable, flexible and certainly capable; recent events have proven this. I assure you, Army Aviation is particularly well suited to fulfill these missions. Our branch is prepared to adapt readily to the constantly changing global realities. Today, more than ever, we face challenges that will test the potency of our branch. Through our collective efforts, the branch will not only succeed but will remain the Army's most relevant force for the future.

Alabama Congressman William L. Dickinson during grand opening ceremonies praises Army Aviation for its role in keeping peace in America. He said, "Army aviators pioneered military flight in this nation, and Army aviators have repeatedly accomplished staggering feats, often at the cost of their lives, in serving America." Seated from left are Mr. Steven Maxham, museum director; Major General Rudolph Ostovich III, commander of the U.S. Army Aviation Center and Ft. Rucker; Lieutenant General John J. Tolson III (U.S. Army, Retired), chairman of the Army Aviation Museum Foundation; and Chaplain Lou Shirey, acting Aviation Center chaplain.

Distinguished guests take part in ribbon cutting ceremonies during the grand opening of the U.S. Army Aviation Museum. From left are Mr. Billy J. Blackmon, mayor of Ozark; Mr. Gene Hughes, mayor of Daleville; Mr. Steven Maxham, museum director; Mr. James R. Balkcom Jr., civilian aide to the Secretary of the Army for the state of Alabama; Ms. Jacquelyn Thompson, mayor of Enterprise; Alabama Congressman William L. Dickinson; Lieutenant General John J. Tolson III (U.S. Army, Retired), chairman of the Army Aviation Museum Foundation; and Major General Rudolph Ostovich III, commander of the U.S. Army Aviation Center and Ft. Rucker.

GRAND OPENING

Army Aviation MUSEUM

Story and Photos by
Mr. Ted Walls
Writer-Editor

ALL ROADS IN the Wiregrass and Ft. Rucker, AL, area lead to the fabulous and exhilarating new U.S. Army Aviation Museum. Distinctive and colorful billboards along Alabama and Florida roadways and brochures attract visitors to one of the largest helicopter collections in the world.

The museum is open to the public daily 0900 to 1600 and closed Christmas Eve and Day, New Year's Eve and Day, Thanksgiving and Easter. The $5 million facility, building 6000, is located at the corner of Andrews and Novosel Avenues.

This new museum building, Dickinson Hall, is named for Alabama Congressman William L. Dickinson in recognition for his leadership in obtaining the federal funds to match locally generated donations for its construction. The naming of this building also recognizes his continual support of Ft. Rucker as a strong military installation. Congressman Dickinson is highly supportive of the museum effort and proudly views it as a monument to aviation of the past and a new industry for the future.

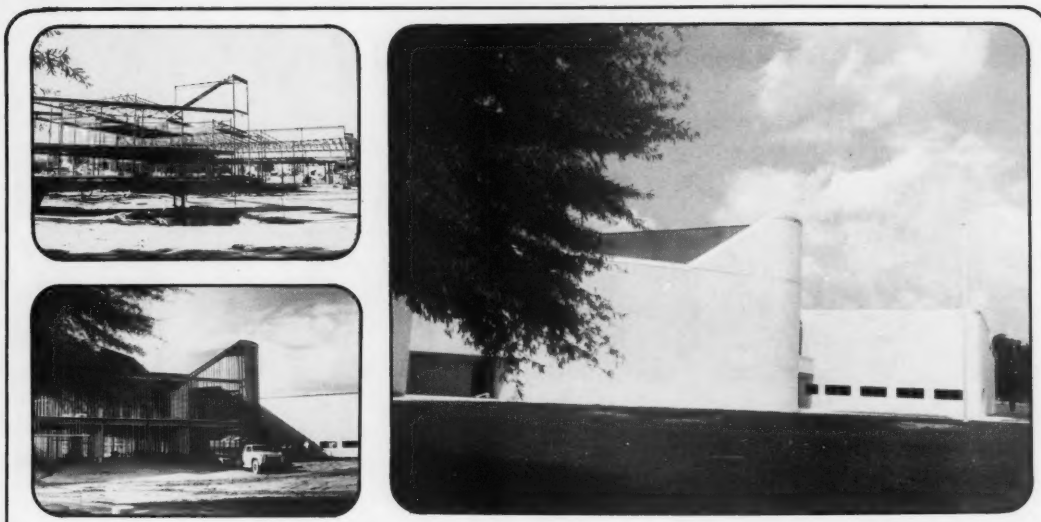
Major General Rudolph Ostovich III, commander of the U.S. Army Aviation Center and Ft. Rucker, comments, "The new museum is a first-rate operation along the lines of the National Air and Space Museum in Washington, DC. It pays tribute to the roots of Army Aviation and gives special recognition to the Vietnam War era, when Army Aviation first really came into its own.

"The name Dickinson Hall is one way to recognize the tremendous support Army Aviation has received from Congressman Dickinson during his extensive service in the U.S. Congress," adds MG Ostovich.

Facilities

The realization of a 20-year dream results in a 87,000 square foot, three-story facility. The first floor is devoted to the main aircraft gallery, administrative offices, theater and gift shop. The gift shop, open 0900 to 1600, offers aviation-related books, T-shirts, models and other paraphernalia, as well as numerous distinctive gift items.

The interpretive exhibit gallery, on the second floor, displays the story line of Army Aviation. Additionally, several hands-on exhibits of fixed- and rotary-wing simulators, numerous experimen-



Early superstructure framing of the offices and second-floor display areas in October 1988 (top left) matures into metal stud framing (bottom left) that attaches to the final construction of exterior wall paneling in June 1989 (right).

tal research and development helicopters and aviation uniforms will help to illustrate the heritage of Army Aviation.

The museum reference library is located on the third floor. Access to this level is restricted to researchers and students by appointment. The library has 3,000 technical aircraft manuals; 1,500 vertical file folders; 600 films; 40,000 photographs; 1,200 general historical references; and several private document collections.

Aircraft Gallery And Displays

The purpose of the aviation museum is to collect, preserve and interpret significant aviation-related historical items pertaining to the history of Army Aviation. Its main attraction is the aircraft gallery on the ground level. The gallery houses many of the significant aircraft from the Army inventory. According to Mr. Steven Maxham, museum director, the aircraft displays are enhanced by mannequin "crews" and eight aircraft suspended from the ceiling.

The exhibits include an L-4B Grasshopper and an R-4B Ho-

The museum has nearly 50 aircraft. They include the following—

Attack Aircraft

AH-1G Cobra; AH-64A Apache; UH-1B Iroquois Gunship; and UH-1B Iroquois with TOW.

Cargo Aircraft

CH-21C Shawnee; CH-34A Choctaw; CH-37B Mojave; CH-47A Chinook; H-25A Army Mule; and UH-19C Chickasaw.

CH-34

Experimental Aircraft

AH-56A Cheyenne; Bell 207 Sioux Scout; Curtis-Wright VZ-7AP Hovercraft; DH-1A GEM Whirlymite; XH-26A Jet Jeep; XROE-1 Rotorcycle; YH-32A Hornet; YHO-3BR; and three drone aircraft.

verfly. The L-4B was the first fixed-wing aircraft purchased by the Army in 1942. It was an observation and reconnaissance aircraft made by the Piper Aircraft Corporation. First accepted in September 1941, it was the principal airplane used by Army Aviation throughout World War II. The R-4B, the first production rotary-wing aircraft also dating to 1942, was an observation, reconnaissance and medical evacuation aircraft produced by the Sikorsky Aircraft Company.

The most recent aircraft in the museum is the AH-64A Apache, dating to 1984. Also in the aircraft gallery is the Bell 207 Sioux Scout manufactured by the Bell Helicopter Company. This model illustrates the first attempt to design an "attack" helicopter for the Army.

The UH-1B Iroquois (better known as Huey) armed with TOW missile system, also in the museum, illustrates the first use of an aerial-launched antitank missile.

What determines the aircraft chosen for the museum? According to Mr. Maxham, he checks three criteria: aircraft flown in a valid mission, in the course of assigned duties and those flown over a sustained period.

Centerpiece

A Vietnam-era diorama creates the central focus of the gallery. As the centerpiece for the museum, it graphically depicts a troop insertion during a Vietnam conflict.

Cost

Half of the $5 million cost of the museum came from private donations. Lieutenant General John J. Tolson III (U.S. Army, Retired), chairman of the Board of Directors, U.S. Army Aviation Museum Foundation, presented a $2.5 million check to Colonel Larry S. Bonine, commander, Mobile District, Corps of Engineers, on 1 February 1988 for construction of the museum. The Corps of Engineers, in turn, received a like sum in matching funds from the Military Construction Appropriations Act.

Phase I Construction

The Ft. Rucker Area Office, U.S. Army Corps of Engineers, reviewed plans and contract documents for the new museum and supervised the project. Mr. Ronald A. "Bo" Carter, civil engineer, comments that this office is proud to have had an active part in the museum's construction. "This facility will further promote the history of and serve as a focal point for Army Aviation," he says.

Groundbreaking took place 28 March 1988. Construction of the museum began 29 March 1988 and was completed 7 November 1989. W. M. Marable, Inc., was the contractor for the museum.

"Erecting the Army Aviation Museum is my most memorable experience," comments Mr. Richard Laframboise, Marable's superintendent of construction. "Although many of us have never been involved with aviation, it is a thrilling experience to be a part of the preservation of Army Aviation history," he adds.

The building, erected on concrete slab, has a prefabricated baked-steel frame supporting a tubular-truss roof framing. Aluminum frame windows, exterior steel doors, metal wall panels and urethane insulation complement the museum's side construction.

Army Aviation Museum Foundation

According to Ms. Shelley Black, director of administration for the Army Aviation Museum Foundation, Inc., five phases are planned for the total construction of the new Army Aviation museum. "The new museum just

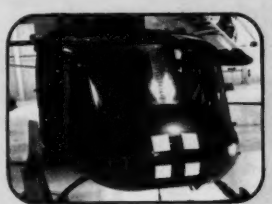
Observation and Reconnaissamce Aircraft

J-3 Piper Cub; L-4B Grasshopper; L-5 Sentinel; L-16A Champion; L-19A Bird Dog; OH-6A Cayuse; OH-58A Kiowa; OH-13E Sioux; OV-1B Mohawk; RU-8D Seminole; and YO-3A Silent One.

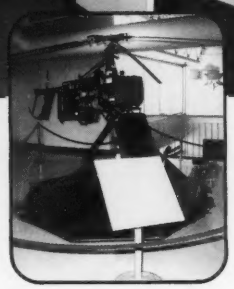
XH-26A Jet Jeep (left) and YHO-3BR

Trainer Aircraft

LC-126A; OH-23B Raven; T-41B Mescalero; TH-13T Sioux; TH-55A Osage; UH-1H Iroquois; and two link trainer simulators.



UH-1



The second floor interpretative exhibits (above) portray the story line of Army Aviation.

The configuration of the DH-1A Whirlymite was tested as a presolo trainer to evaluate the pilot's training time. The student pilot was able to train in complete safety since the platform would not allow the helicopter to tip over.

constructed is phase one," she says. "Plans for the next four phases include construction of additional buildings near the new museum that will house more display areas, warehouses, workshops or whatever is needed for the future growth of the museum," she adds.

"Retired Army personnel and local civilians established the museum foundation in 1970 to enhance the growth and interest of Army Aviation," Ms. Black continues. "The foundation has about 30 members from industry, 30 distinguished members and 100 charter members. The patron member is His Royal Highness Prince General Faisal M. Al-Saud of Saudi Arabia. He is a major contributor who attended flight school at Ft. Rucker in the 1970s.

Ms. Black says the foundation will sponsor future fund drives for the additional museum construction. She hopes when contributors see how the $5 million dream became a reality, the public will be willing to donate again. Annual attendance in the old museum averaged 100,000 visitors, she states. Military officials believe the new museum will be one of the most rewarding attractions in the Wiregrass and the entire southeastern United States. They hope attendance will increase steadily.

"Completion of the Army Aviation Museum is the realization of a 20-year dream," says Command Sergeant Major Roger Putnam (U.S. Army, Retired), museum foundation board member.

The foundation is still taking donations from individuals who want to witness and participate in the continual growth of the new museum. Tax deductible contributions may be mailed to the Army Aviation Museum Foundation, P.O. Box 610, Ft. Rucker, AL 36362.

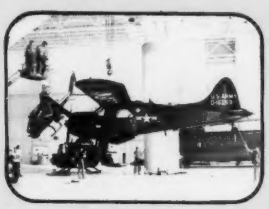
Utility Aircraft

L-5G Sentinel (MEDEVAC); OH-13E Sioux (MEDEVAC); OH-23A Raven (MEDEVAC); R-4B Hoverfly; U-1A Otter; UH-1D Iroquois (Air Assault); UH-1H Iroquois (MEDEVAC); and U-6A Beaver.

Training aircraft (foreground)

Aircraft hung from ceiling

AH-1G Cobra; L-16A Champion; L-19A Bird Dog; OH-6A Cayuse; OH-13E Sioux; U-1A Otter; U-6A Beaver; and UH-1H Iroquois (MEDEVAC).



U-6

Warrant officer candidates (WOCs) help move and prepare aircraft for display (clockwise from top); WOC Terry B. Polwort (left) and Bill D. Haug stencil and mask lettering on an AH-56A Cheyenne.

WOC Rodney McAnally (left) and SPC Tom McClellan, museum maintenance NCOIC, attach a support cable to the landing gear of a U-6A Beaver.

WOC Archer D. Hirschhorn installs the antenna on a UH-1D Huey.

Left to right: R-5, R-6 and R-4 Sikorsky helicopters were used by the Army Ground Forces during World War II.

The Army Ground Forces and the Helicopter

1941 to 1945

This article is the first in a series on Army Aviation logistics history.

Dr. Howard K. Butler
Historical Division
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St. Louis, MO

THANKS TO A NUMBER of pseudo-historical products that primarily rest upon suspect secondary sources, the lay reader could easily gain a number of misconceptions about the relationship of the helicopter to the Army Ground Forces (AGF) and its successor organizations. The most important of these misconstructions are all terminal in nature, characterized by such examples as:

- The French in Algeria were the first to mount and fire rockets from helicopters.
- American armed helicopter experiments began at the close of the Korean War.
- Attack and antitank helicopter theory began to take form in the late 1950s.

Actually, the AGF took every one of these steps not later than during or just after the end of World War II. The AGF's rotorcraft speculations were inclusive of, and often beyond, all of that equipment that began appearing 20 to 40 years later. Past the piston-engined, unarmed L-4 Cubs, the AGF foresaw an Army air arm consisting of fixed-wing and rotary-wing ambulances, television relaying reconnaissance aircraft and elevated weapons platforms—its term—that could operate anytime in any weather and that carried enough automatically loaded rockets, cannon and recoilless rifles to make either a T-72 tank or a Mi-24 Hind helicopter head for cover. The AGF saw this force, moreover, as one firmly under its control—the ground commander was its commander.

The Helicopter Enlists

Though the Kellett Autogiro donned Army blue in 1935, the first "true" helicopter to come aboard was one Sikorsky XR-4 Hoverfly in November 1941. The Army, that was the Army Air Forces (AAF), bought 131 more R-4s during World War II, as well as 67 R-5s and 225 R-6s, for a total of 424 helicopters.[1] Compared to the total AAF wartime procurement of nearly 300,000 aircraft, that number seems small. The AAF, moreover, transferred 98 of these helicopters to the Navy.[2]

[1] (1) Office of the Assistant Secretary of Defense Study, December 1975, subject: Army Helicopter Facts, Acceptances and Flyaway Costs, From 1942 through 1948. (2) R signified rotorcraft, Y prototype and X experimental.
[2] Richard Tierney, *The Army Aviation Story*, Colonial Press, Northport, AL, 1963, pp. 253-255.

Use

The helicopter saw little action in the war. A YR-4 did, however, effect what was apparently the first American heliborne rescue of the conflict, on 23 and 24 April 1944. A light aircraft with four men onboard had engine trouble and landed behind Nipponese lines in Burma. On the first day, the YR-4 picked up two of the four, then it overheated. After an overnight cooldown, the YR-4 picked up the other two the next day.[3]

Test Bodies

The AGF kept abreast of developments in helicopter and other air matters via two bodies:

- The first was the *Airborne Board*, activated in December 1944 at Camp Mackall, NC. The roots of this board were the Testing and Developing Section of the Airborne Command, organized in 1942 at Camp Mackall, and the Parachute Test Platoon, activated at Ft. Benning, GA, in June 1940.
- The second was the *Air Support Service Test Section* of the AGF. Activated on 1 October 1945 at the AAF Center in Orlando, FL, it absorbed the 12-man AGF Liaison Detachment station at Eglin Air Force Base (AFB), FL.

The Airborne Board was the more extensive and important of the two. Inheriting airborne detachments in Europe, the board dispatched another such section to the Pacific. It also had liaison officers at the AAF's Air Transport Service Command, at the AAF Center in Orlando and in the Requirements Section of the headquarters of AGF.[4]

The board's main interests lay in parachutes and gliders, but it did, in October 1944, borrow an XR-6A from the AAF for tests at Camp Mackall. These tests persisted. In December 1945, the section mounted, then fired, rockets on the R-6. On 1 October 1945, the board became the Airborne Service Test Section of the AGF.

The Air Support Service Test Section had even more potential as an experimenter in aircraft development. Its concerns included ". . .rockets and aircraft guns used to attach ground targets; aerial reconnaissance and aerial photography; helicopters; parachutes; and gliders." The section dissolved in April 1946 when the AAF organized the Air University at Maxwell AFB, AL.[5]

Above and right: The R-4 Hoverfly is historically significant. It was the first helicopter produced for any of the U.S. military forces in other than experimental quantities.

Rotorcraft Applications and The Cook Board[6]

A large party within the AGF saw the 1942 authorization for liaison aircraft as a wedge for a complete air arm. Their opportunity to expand it came in August 1944, when the War Department directed the AGF to determine what equipment the postwar Army should have.[7] In December 1944, the AGF set up this board under the chairmanship of Major General Gilbert R. Cook.[8]

On 20 June 1945, the board published its report. In aviation, it presented the AGF with its own tactical air force, an air force with applications as complete, or more so, as in the Army of today.[9] The thorough treatise began so:

Role and Missions

"a. There is a need for organic ground support aviation within the ground forces. This aviation would be operated by ground force personnel and would be employed for close fire support, tactical reconnaissance, photography, control and liaison,

limited transportation, and emergency supply and evacuation.

"b. The organic ground support aviation should have as its sole mission the close support of ground troops in combat."

At this point, the board inserted what is now known as a "disclaimer," which conceded both the existence of the AAF and its possible helpfulness:

"The provision of this special aviation within the ground forces need not effect materially the present or future organization of the AAF nor the present missions of its Strategical or Tactical Air Forces. . . [which are,] in the order of priority listed in our present doctrine, namely

(1) To gain the necessary degree of air superiority.

(2) To present the movement of hostile troops and supplies into the theater of operations or within the theater.

(3) To participate in a combined effort of the air and ground forces, in the battle area, to gain objectives on the immediate front of the ground forces."

This standing operating procedure aside, the board proceeded to describe a world in which ". . . aircraft, like automobiles, will become so commonplace and will present advantages which are so desirable to ground units that certain types and numbers of these vehicles must be decentralized to, make [sic] organic to, and thus placed under command of ground formations."

Aircraft Requirements

The board next systematically discussed the five types of aircraft needed: photographic; tactical reconnaissance; light, either liaison or helicopter; fire support; transportation (and what special

[3] Joint Intelligence Collection Agency, China Burma India [report], 3 May 1944, subject: BURMA—First Combat use of Helicopter In.
[4] History, Army Ground Forces (AGF) Board No. I, Ft. Monroe, VA, 1948, pp. 10-12, 16-17.
[5] Ibid., p. 20.
[6] Author's designation.
[7] Memorandum, WDGDS, MG R. L. Maxwell, ACofS, G4, to CG, AGF, 19 August 1944, subject: Equipment for the Post War Army.
[8] Memorandum, No. 40, MG E.F. Olsen, GAG, HQ, AGF, to MG Gilbert R. Cook, 5 December 1944, subject: Equipment Review Board.
[9] 1987.

equipment was necessary for them); an integrated ground-air radio communication system; the latest navigation fire control and identification and interrogation equipment; and equipment to permit night operation.

The board was either astonishingly foresighted, or, more likely, it reflected widely held current AGF interests in organic air arm potentialities. Hence, its discussion of the particulars of types included such entries as:

• "6. *Tactical reconnaissance aircraft*. . .b. Photographic means, direct observation by personnel, and television equipment are required in this organic reconnaissance aviation. TV will provide an indirect visual means that could transmit a view to receivers located at a command post on the ground, then extended [sic] the 'eyes' of the commander to distant points. . .[via] horizontally and vertically stabilizing the TV lens. . . .

• "8. *Fire support aircraft*. a. Types. Fire support aircraft of the following types are required:

(1) Flying artillery.

(2) Flying tanks or tank destroyers.

b. *Mission*. . .these aircraft would have the exclusive mission of furnishing close fire support to the ground troops. . .[They would fly] from the antiaircraft artillery fire zone of friendly ground troops as a base, normally without fighter cover. They should be armored, and carry armament to permit the delivery of heavy and accurate fire, from elevated platforms, in close support of the ground troops. . .[These] missions. . .would be comparable, respectively, to the missions of ground artillery, and ground tanks or tank destroyers.

"[Using] low flying speeds. . .[and possessing an] Endurance of at least four hours,. . .[these craft] should be sufficiently armored to be able to withstand small arms fire and shell fragments. . .[Their] armament carried would depend upon the mission. . .Machine Guns, rockets, recoilless weapons, bombs, and smoke or chemical spraying equipment shall be utilized. . ..

• "and 9. *Transport Aircraft*. [These should be]. . .low speed aircraft, or aircraft of the helicopter type, which can carry sufficient payload for the transport of emergency supplies and personnel within the combat zone for evacuation. . . These transport aircraft will be used in a manner similar to the. . .2½-ton truck in tactical units and QM Truck Companies and the Ambulance in the Ambulance Collecting companies. . . ."

Tactical Air Support

The board was not at all happy with current tactical air support, either as expressed in FM 100-20 (now obsolete), in which it was a third priority, or in practice:

"There is an urgent requirement for close support aircraft, organic to and operated by the ground forces, which would be available at all times and which would have the exclusive mission of furnishing that close support to the ground forces."

Present practice was poor in every aspect:

"c. Aircraft thus far assigned in support of ground troops have not been designed specifically for that purpose. . . .

"d. [Cooperation between AAF air controllers and AGF ground commanders was in disarray, for the]. . .problems, tactics, and techniques of one must be understood by the other. This cannot be done in a few hours or a few days of working together. These men must live and work together daily in training and in battle. There is no place in this set-up for two teams or for co-equality; it must be one team with one commander. Only by having the personnel organic to the ground forces can the required cooperation be assured.

"e. The low priority given training and equipment of air force units for close ground support has constituted a serious obstacle to effective combined air-ground operations during the present war. . . .

"f. The present policy of centralized control of

The R-5 helicopter saw limited use by Army Ground Forces.

tactical reconnaissance aviation under the air forces has resulted, on numerous occasions, in failure to get highly important information to front line units in time to be of great value. There is a distinct need for tactical reconnaissance aircraft, on the corps or division level, organic to the ground forces. . .[and] in addition to the tactical and strategic reconnaissance aviation in the AAF."

An AGF Tactical Air Arm

The report was thus careful not to advocate either the dismantling of the AAF, or the detailing of segments from it, but its recommendations, if carried out, would certainly obviate and duplicate much of the prospective junior service. To underscore any doubts that such were its aims, the report continued with this entry:

"11. *Aircraft weapons for use against ground targets.* The development of weapons for use on aircraft of *both* [author's underscore] the Air Force and the organic ground support aviation against ground targets should include the following:

a. Guided bombs.

b. Guided power-driven missiles. . . .

c. Directional flame throwing bombs and projectiles.

d. High explosive rockets capable of penetrating armor.

e. Shaped charge bombs with stand off fuse [sic] to take advantage of the shaped charge principle in penetrating armor or reinforced concrete.

f. High velocity armor-piercing antitank weapons for the direct attack of armor.

g. VT[10] fuses for providing airburst of bombs and other missiles.

h. Developments to increase the chemical carrying capacity of aircraft and to increase the length and duration of smoke screens."

Military Characteristics

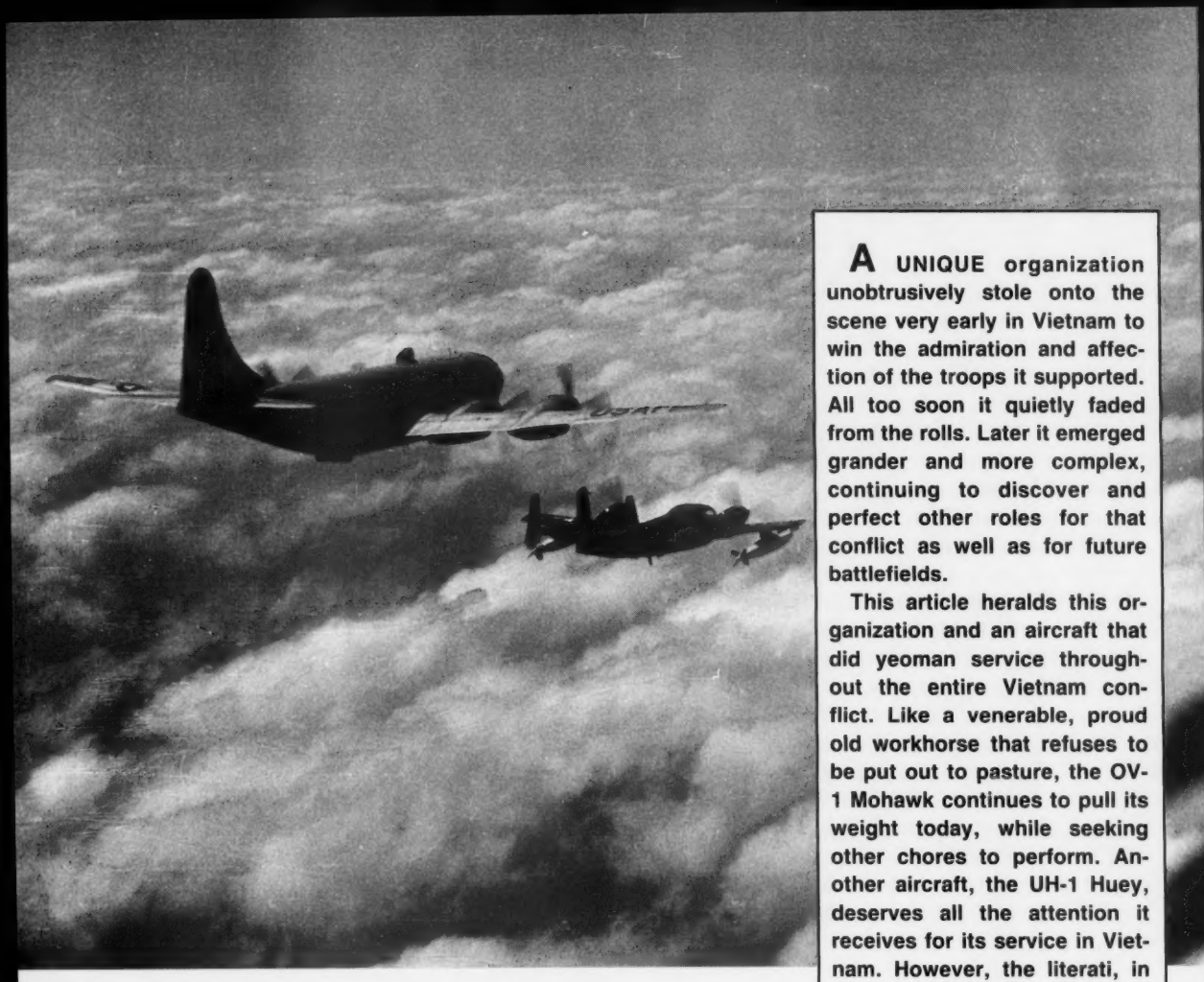
The aircraft portions of the report closed with a lengthy list of aircraft and their desired military characteristics. The aircraft included a 10-ton payload assault aircraft, for cargo and glider towing; a 50-ton cargo aircraft; various mapping and tactical reconnaissance aircraft; fire support aircraft, either fixed or rotary wing, for the close support of ground troops; medical ambulance aircraft, also either fixed or rotary wing; and large cargo aircraft. The aircraft specifics matched or exceeded anything in operation 40 years later. For example, the fire support aircraft, either fixed or rotary wing and single or multiengined, were to carry one to four cannons and rocket launchers or recoilless guns not to exceed 105 millimeter (mm) in caliber; remote control automatic loaders; a crew flak-suited to stop flak and .50 caliber rounds; and a capability of operation in day or night and in all types of weather while flying at speeds up to 100 to 150 knots per hour. The flying tank or tank destroyer had to have the same characteristics, except that its guns were not to exceed 90 mm in caliber, or enough firepower to penetrate 6 inches of homogeneous armor at 500 yards. To remedy this deficiency the flying tank could carry a 500-pound payload of bombs.

Perspective

The board's other general officers included Major General Floyd E. Jones and Brigadier Generals Benjamin G. Ferris and Rupert E. Starr.[11] Four general officers certainly imply some weight and, if the war had continued onward as supposed for another 2 years, perhaps some of their ambitious program might have come forth. The sudden end of the war and concomitant fiscal austerity, the atomic bomb, and a furious Army-Navy postwar roles and missions war all served, however, to postpone fulfillment of the board's air power objectives for nearly 40 years. To preserve whatever it had, the Army's top leadership muffled internal aggressiveness and imposed, in its stead, unification as the watchword.

The R-6, another early vintage helicopter.

[10] Variable time.
[11] AGF, pp. 114-147.



IN RELATIVE OBSCURITY

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"A LOST BATTLE IS A BATTLE ONE THINKS ONE HAS LOST"

Ferdinand Foch
(1851-1929)
Principes de Guerre

A UNIQUE organization unobtrusively stole onto the scene very early in Vietnam to win the admiration and affection of the troops it supported. All too soon it quietly faded from the rolls. Later it emerged grander and more complex, continuing to discover and perfect other roles for that conflict as well as for future battlefields.

This article heralds this organization and an aircraft that did yeoman service throughout the entire Vietnam conflict. Like a venerable, proud old workhorse that refuses to be put out to pasture, the OV-1 Mohawk continues to pull its weight today, while seeking other chores to perform. Another aircraft, the UH-1 Huey, deserves all the attention it receives for its service in Vietnam. However, the literati, in their monographs on that war, too often assessed the UH-1 as "Army Aviation's contribution in Vietnam."

Other aircraft—some of them of the fixed-wing variety—were important players in that effort as well. The OV-1 Mohawk was one of those aircraft, an aircraft that performed nobly, without fanfare, *in relative obscurity*. When the news media realized their camera crews did not have room to get in the cockpit with them, they lost interest in the Mohawk!

The first Army Aviation units to serve in Vietnam arrived at a pier in downtown Saigon in December 1961. Offloading from the aircraft carrying ship, the U.S. Navy Ship *Core*, were 32 CH-21 Shawnees and 400 men. The equipment and men belonged to the 57th Transportation Company (Light Helicopter) from Ft. Lewis, WA, and the 8th Transportation Company (Light Helicopter) from Ft. Bragg, NC. Thus began what was to become a long, arduous adventure and the opportunity for Army Aviation that has led to its current position as a key member of the Army's combined arms team.

In those early days of September 1962, an unusual, one-of-a-kind, unit arrived on the scene in Vietnam. It was designated the 23d Special Warfare Aviation Detachment (SWAD). This unit was composed solely of JOV-1A Mohawks. The SWAD was in Vietnam to perform operational testing and its weapons were, ostensibly, for self-protection.

The JOV-1A was the armed version of the Grumman OV-1. Its armament consisted of General Electric SUU-12 gun pods carrying the Army standard .50-caliber machinegun. The universal pylons were capable of carrying a variety of other weapons. In the cockpit the pilot had a selector panel for the six pylons and a Mark 20 gunsight. These weapons were a "big bone" of contention with the U.S. Air Force. More about this later.

Naval vessels transported Mohawks to Subic Bay, Philippine Islands. Aircraft were hoisted over the main gate at Naval Air Station, Cubi Point, after they were transported by truck on a lowboy from the pier.

OV-1s equipped with oversized 300-gallon drop tanks were ferried to Vietnam. An Air Force search and rescue version of the KC-97 from Clark Air Force Base, Philippine Islands, served as lead ship for the ferry flight.

Mekong Delta—IV Corps

The 23d moved around Vietnam for a while until it finally "rooted in" at Vung Tau. The unit continued to provide support all over the country as directed by the Military Assistance Command, Vietnam (MACV); however, it was committed to daily support of the Army of Vietnam (ARVN) IV Corps headquartered at Can Tho. Can Tho was located dead center in the Mekong Delta. IV Corps consisted of the 7th, 9th and 21st ARVN Divisions, arrayed roughly north to south, respectively, in the Delta.

That daily commitment required that the SWAD provide two aircraft in the morning (wheels in the well at 0600 hours) and two aircraft in the afternoon (airborne at 1300 hours). These aircraft flew surveillance of en-

emy sightings compiled daily by each division G2 from intelligence reports and plotted nightly on the corps G2 situation board. Each night our corps liaison officer called in these coordinates, and the estimated unit size, to the SWAD. These sightings were plotted similarly on the SWAD mission board from which the next day's missions were drawn. Our pilots all pulled corps liaison officer duty rotating in 2-week shifts.

The morning flight would cover one whole division's (e.g., the 7th) reported sightings and as much of a second division's as they could. The morning flight team had to be back at base not later than 1200 hours so that they could consult with the afternoon team. The afternoon team would fly the balance of the sightings. Both teams would contact the American advisers at the division tactical operations centers on FM radio when they approached that division's area of operations (AO) and check on immediates and/or updates to that division's plots.

These missions produced a great deal of action. Invariably, the Mohawks would be shot at while checking out these many sightings. If artillery were available, the crew would initiate and adjust a fire mission against the target. More often than not, the Mohawks would engage the targets themselves. The rules of engagement (i.e., you could return ground fire) allowed for that. We followed the rules of engagement like religious zealots. On occasion, however, muzzle flashes turned out to be sun glint or some other anomaly. By this time, the Mohawks carried rockets and/or machineguns and were more than adequately equipped, not to mention eager, to handle the situation.

If the target appeared to be lucrative enough, the division would try to mount a heliborne assault. Occasionally, such a force would be standing by already. The 21st ARVN Division was the SWAD's favorite because its senior American adviser, callsign "Bull Moose," was extremely aggressive. His division mounted more operations than the other divisions in IV Corps combined. In those days when body counts were the big yardstick for measuring success, Bull Moose consistently achieved the most success. Of course, the fact that Bull Moose was a big believer in the armed Mohawk had

Wingman's view as flight leader leads team down to begin mission. Letdown generally was done 10 to 20 kilometers from initial target. Object at right is the Mark 20 gunsight.

no bearing on our esteem for him; he was simply a very bright fellow. He had been known to cancel operations if the Mohawks couldn't play.

Coordinating with the Vietnamese Air Force could be, and often was, a protracted affair. Bull Moose preferred contacting the SWAD on one day for operational support missions the next. Although our firepower was useful, it was not the main reason he wanted us. He came to appreciate the Mohawk's superiority in surveillance and the SWAD crew's ability to ferret out the most lucrative targets. On his operations, the Mohawks would go out and "beat the bushes" in the mission area, while his assault force stood by their helicopters at a nearby staging area waiting for the word to come.

Silent Death—I and II Corps

The other commitments, assigned by MACV, that the 23d serviced ranged all over the country. Another corps or an intelligence officer of a district headquarters would request, through MACV, assistance for surveillance and photography. A team of two or more OV-1As would be dispatched with appropriate support personnel for whatever time was required. (OV-1As were so designated to appease the Air Force. The Air Force assumed the designation meant we were no longer armed—well you know what happens when you assume something.)

We also had a U-6A Beaver (dubbed "Casper the Ghost" for its white paint job) in the SWAD to facilitate these moves. Plus, we always received help from the U-1 Otters and the CV-2 Caribous (when they still belonged to us). This was in the days before the Signal Corps came in (after the build-up of U.S. forces in mid-1965) and established a flight following service and added numerous navigational aids.

Flying in areas like I and II Corps could be interesting. Our infrequent appearances in the sky over these large expanses did not instill the fear and respect that the Vietcong (VC) accorded us down in IV Corps where we were "beating up the sky" every day. More importantly, these upcountry VC, and soon the North Vietnamese Army (NVA), had to learn the hazards of "Silent Death" or "Whispering Death," as we were known down south.

The Mohawk, with the turboprops pulled back to 1050 to 1100 revolutions per minute, was extremely quiet with practically no forward projection of sound. Only when passing overhead was the quiet, distinct whistling of the turbines audible. No other turbine-equipped Army aircraft, even today, has such a pleasing aphonic quality. Operating over the treetops reduced visual detection until close-in. Better yet, it restricted the enemy's engagement window to get a shot at us. Devoid of the flapping of rotors, or of the whine of reciprocating engines and their props or of the roar of the pure jet aircraft, the Mohawk operated silently in virtual stealth. That feature, more than any other factor, gave us some of our most productive and rewarding results.

A good example of this was when a detachment of eight Air Force A-1E Skyraiders joined with my four OV-1As in Qui Nhon to provide aerial support for II Corps. The district G2 briefed us that captured documents indicated a regimental force was advancing out of Laos near the Dak Pek area. The regiment's objective was to overrun the district headquarters in Phu Cat.

A few days later, we were returning from a search of the Dak Pek—Dak To Corridor, skimming along treetops heading southeasterly back to Qui Nhon. About 35 nautical miles out of Qui Nhon, we broke over a bend in a large river and, lo and behold, below us was the largest concentration of VC/NVA troops I had ever seen. We later determined that the unit exceeded 1,200 men. Most of the troops were lying on their rucksacks resting, while others were washing in the river. Their mouths literally dropped when we appeared directly over them. They jumped up, scurrying for the trees. Perfect! That would make our rockets, equipped with delay fuzes designed for bursting in jungle canopies, all the more effective.

As lead aircraft, I immediately stood my bird on its tail (to obtain some altitude for high-angle dive runs). Simultaneously, I contacted our operations tent at Qui Nhon with the information. The Mohawks and Skyraiders shared the ramp located on the mountain side of the Qui Nhon airfield. The Air Force had a flight of four A-1Es scheduled to relieve us on the area search mission so those aircraft should be ready to go. We would stay on-station rationing our rockets until the A-1Es arrived to take over. We proceeded to initiate our daisy chain attack, attempting to herd the VC together.

Soon, within 15 minutes, the A-1Es, led by their forward air controller (FAC) in an 0-1 Bird

OV-1 returning to base at Vung Tau from over Mekong Delta in the vicinity of Soc Trang.

Dog, appeared. After a quick orientation, the FAC took over. This allowed us to rearm and refuel. Over the next hour and a half, we returned three times to the area, as did the A-1Es. The latter added two more aircraft (recently returning from another mission) and formed two flights of three aircraft. Finally, an assault force was lifted out to the area and "cleaned up" what was left. The body count was more than 300 with many wounded left behind.

A SAM Kill

The SWAD had become quite proficient at aerial photography. Our photo-mosaics were in great demand; they were perfect for operational planning, perimeter defenses, etc., because many of our maps were of World War II vintage. Some commanders liked to have a mosaic of their AO hanging on the wall. Flying photo-mosaic missions was a dangerous business under any circumstance. These missions were particularly dangerous when weather conditions forced us to fly lower and closer to the ground fire. Because the area being photographed usually was intended for planning an operation, we definitely were going to be fired on. It wasn't the flying low that we hated so much as the need to fly straight and level for numerous photo runs. This would ensure coverage of the entire area with the overlap needed to construct an acceptable mosaic. A good wingman, protecting your rear quarter, was absolutely indispensable.

We became involved with the Air Force, through our photo-mosaics, in the first applications of Agent Orange and the defoliation program. (Working with Agent Orange is something I have since come to regret.) We serviced a request for mosaics to assist the Air Force's mission planning to defoliate the biggest VC encampment area in the Mekong Delta—the U Minh Forest. We personally delivered the mosaics to the C-123 Provider squadron at Tan Son Nhut. After discussing the enemy concentration areas where we had experienced the most ground fire, they asked if we could accompany them during their mission. Cleared by MACV, the mission required several days to complete. We covered them with fire when required. The mission went so well that, a few months later, they requested us to assist them again.

This mission was the defoliation of portions of the Ho Chi Minh Trail—north where it proceeds into Laos from North Vietnam and continues down toward Cambodia. The idea was to make the trail easier to interdict by thinning out the jungle canopy. We deployed six Mohawks to Da Nang to begin photographing the area along the trail. These mis-

sions required our flying into the southern portion of North Vietnam down into Laos. The basic route of the trail was determined with side looking airborne radar (SLAR) monitoring vehicle traffic and then further defined by infrared (IR) imagery. These missions were flown mainly at night. We then followed up with photo-runs to complete the necessary footage for the mosaic.

As good luck would have it, I was able to work the mission for only a few days. I had to depart the operation and get back to Vung Tau to catch a C-130 Hercules and travel to the Cubi Point, Naval Air Station, Subic Bay, Philippine Islands. The C-130 would carry a large team from the 73d to Cubi Point to pickup and process several replacement Mohawks. New Mohawks generally were delivered there by small Navy carriers. Then, after processing, the aircraft were ferried across to South Vietnam. These trips to the Philippine Islands were avidly sought by our pilots. It was my turn. So with pilots, maintenance crews, tech-reps and other support personnel, we were off for a treasured respite.

While in the Philippine Islands, we had to contact unit operations in Vung Tau to request that a replacement engine be dispatched to us; one caught fire during a test flight. Operations informed us that four of our six aircraft at Da Nang had been shot down. Three were attributed to enemy antiaircraft artillery. The fourth was the first Army aircraft shot down by a Soviet surface-to-air missile (SAM). We had had other aircraft shot down but not so many so close together. This was devastating news. Operations could not tell us any details over the phone. What they did tell us was cryptic in the interest of operational security. Although a couple of the crews survived by ejecting, they were captured but were not part of the repatriated contingent released later at the end of the war.

Air-Conditioned Mohawks

Besides the visual and photographic surveillance and the firepower capability of the Mohawk, the SWAD and its Mohawks often supported field tests of new developments. The 23d tested a "people sniffer" that sampled the air while flying low over the jungle and detected $C_5 H_4 N_4 O_3$—uric acid. On the "assumption" that uric acid meant people, a positive detection on the sniffer would result in an artillery or airstrike to interdict the area. The system worked quite well.

But, finally, the developers realized that animals do number one also. Certain that the Society for the Prevention of Cruelty to Animals would "raise the roof" about killing harmless animals, the developers went back to the drawing board. They later returned with a new detector designed to respond to amino acid scents associated with perspiration. No one enjoyed flying these missions because the sniffer unit had to be strapped in the observers seat with the sensing probe stuck down the message drop-tube. No one wanted to give up his observer. Fortunately, the SWAD had to conduct the test and not fly the sensors operationally.

We also tested several versions of the Starlight scope. Another new piece of equipment added to the Mohawk surveillance suite was the KS-61 panoramic camera mounted in the nose near the ram air chin-scoop. This camera took excellent pictures. It featured a film coated with a new emulsion composition that allowed the pictures to be enlarged greatly before they became grainy. This increased the ability to resolve targets that would have been obscured when enlarged as much on film of our other camera, the belly-mounted KS-30.

The problem we found with the KS-61 was it obstructed the ram air feed from the chin-scoop leading into the cockpit, making the cockpit stifling. It wasn't unusual for a member of a flight team to radio..."Going Up"...and suddenly zoom up more than 10,000 feet to cool down and stave off dizziness.

The flight surgeon, noting some crews were suffering from dehydration upon their return from missions, made us weigh-in before and after every mission. He found that the crew's average weight loss was in excess of 6 pounds. Having flown with us several times on missions, he knew that, during each mission, the crews landed at least twice to rearm and refuel at various fields about the Delta. He knew, also, that the crews would consume soft drinks (nobody could drink the water*) each time while waiting for the aircraft to be serviced. Despite that, they still sustained the excessive fluid loss.

Acting immediately, the doctor pushed to get rid of the flak vests

* The drinking water was so heavily treated with purifying chemicals that it tasted, looked and smelled terrible. But, worst of all, most people got a bladder infection from the caustic effect of those chemicals.

we wore. We also had on Mae Wests, survival vests and ejection seat harnesses we had been trying to get rid of from the start. We were unable to get rid of the rubberized Mae Wests because we flew "feet wet." This problem was reported back Stateside immediately. As a result, later Mohawks were fitted with air conditioning units. These units later became known by their more acceptable and less wimpish name—environmental control unit—when installed on the AH-1 Cobra. For our gun pilots, the worst part of losing so much ram air was being blinded by the excessive sweat rolling down the brow into the eyes, while making the standard 4-G (gravity) pull up after a gun-run. The aircraft could be moving between 300 and 400 knots during the steep attacks and terminating fairly close to the ground. Thus, any distraction, such as sweat in your eyes, could be catastrophic.

SWAD Pilot Training

The SWAD pilots were all graduates of the Aerial Gunnery School at Naval Air Station (NAS), Jacksonville (JAX), FL. There we spent several weeks qualifying in the assorted weapons systems we would be using in Vietnam. We perfected dive angles and speeds, trimming controls (important for rockets) and pickle altitudes in dry runs. This training was followed, after a couple of days, by live fire drills. In between takeoff/kiss-offs, we learned about formation flying. We thought we were good before we got to NAS JAX, but there was plenty of room for improvement. We learned not to be vocal while flying formation. After takeoff, when number four called "four's up," not a word would be said by lead. He continually changed the formation like a choreographer with simple wing-waggles. Before you knew it, he gave you a kiss-off and you peeled off over the gunnery range or airfield.

Altogether, flying at NAS JAX may have been some of best flying and fun we ever had. My stickmate through transition and gunnery school and I were the first Hawk-Jocks to go to NAS JAX and then directly to the new surveillance school at the Electronic Warfare Center, Ft. Huachuca, AZ. At the surveillance school, we qualified in the various surveillance systems of the OV-1B SLAR and the OV-1C IR and their photographic systems.

An important aspect of the training was the Doppler navigation system that was necessary particularly for IR missions. The biggest problem of all was fighting the monotony of flying "long legs" on SLAR missions. SLAR has to be flown on autopilot to preclude causing breaks in the imagery. Since most tech-observers don't want your help, the pilot did not have much to do. Years later when we installed the data-link capability in the aircraft, monotony on SLAR missions no longer applied.

Finally, after completing our training in Arizona, my stickmate and I were ready to proceed to Travis Air Force Base, CA, to catch our flight into Tan Son Nhut. As foolish as it sounds, considering our later long involvement in Vietnam, we were anxious to begin our tours. After a day or two of orientation at MACV Headquarters (HQ) in Saigon, we hopped a flight to Vung Tau. From there things happened fast—meeting old friends, making new ones and getting into the flow of the day-to-day activities. After a quick trip or two around the pattern for a few touchdowns and emergency procedures, we broke out of the traffic pattern. We joined up with another Mohawk, and headed west over the bay toward the Mekong Delta.

The gravity of what my tour in Vietnam would be like became evident on that very first mission. After arriving in the 9th Division's AO, we got into "a heck of a shoot out" with some ground forces; the lead aircraft took several hits in the process. We had to get use to the idea that people were trying to kill us. But flying the armed Mohawk turned out to be all that I had expected and then some!

Shortly after arriving at Vung Tau, Chief of Staff, Army (CSA) General Harold K. Johnson, accompanied by General William C. Westmoreland, commander, MACV, visited our unit. The pilots stood by their birds as the entourage crossed the parking ramp to "troop the line." General Johnson looked up as they walked along and did a double take. It just dawned on him that those were guns and rockets hanging under the wings of our aircraft. He turned to General Westmoreland sputtering, "What are those guns doing on those aircraft—I want those guns off those planes!" As CSA he had endured much of the Air Force invective—the Air Force's hackles were really up about the armed Mohawk. We almost died, especially the newbies like me who had been on orders for this assignment for well over a year and

had finished 5 months of specialized training. General Westmoreland, unflappable and without missing a step, continued walking, telling General Johnson that they would talk about it later. *NO!! TALK TO HIM NOW! (I'm thinking).*

For days after that visit, we maintained a very low profile, waiting for the word that we were going to be flying slicked-down Hawks. Finally our commander returned from a staff meeting at MACV HQ, assembled us and gave the *blessed* word "all was right with the world" and the guns would stay.

The 23d Is No More

In late 1964, an aerial surveillance and target acquisition (ASTA) detachment from Ft. Bragg deployed to Vung Tau. The ASTA detachment consisted of OV-1Bs and OV-1Cs and support personnel. Included were a large contingent of imagery interpreters (IIs) and their specially equipped expansion vans. The two organizations merged and were designated the 73d Surveillance Airplane Company (SAC).

The flight platoons naturally retained the integrity of their previous units so that the old SWAD became simply the "Gun Platoon," while the ASTA detachment was referred to as the "Exotic Platoon." Absolutely no factionalism or cliquishness was exhibited as both groups quickly hit it off. The previous esprit and camaraderie of the old 23d now were amplified by virtue of the expanded organization now called the 73d SAC.

A good-natured rivalry between the two platoons fed our unit's conviviality. The "Exotics" referred to us as the "Glory Boys" or "Murder, Inc." as well as many unprintables, but they envied our having the gunship to fly. Because the OV-1A is equipped with dual controls, they would jump at the chance to fly with us. We were glad to have them (having another pilot beat flying with the nonrated ARVN officers). On the other hand, we ragged the Exotics because they could spend their days on the beautiful beaches at Vung Tau, working on their tans, and then fly their missions in the relative cool of the evenings. But we had a deep respect for those guys and their technical observers because of the tough job they had to do flying those IR and SLAR missions night after night in good weather and bad. Moreover, we knew they contributed the most to the future of Army intelligence and surveillance. Breaking new ground in the Army, they were developing, as they went, how the Army could best use these new eyes and ears of the ground commanders. The whole process was so new that even our IIs had to learn "on-the-fly" as it were. They were writing the book.

Designated a company, our unit was, in fact, a small battalion. We had our own machine shops; upper echelon aircraft and automotive maintenance and supply; a liquid nitrogen plant to produce coolant for the IR systems; a big ordnance section; a petroleum section; an II section; a detachment of ARVN officers who flew as observers in the gunships; a complete commo/avionics maintenance and supply crew; enough personnel to run the consolidated messes at the airfield and at Vung Tau; and other groups, the largest of which was the civilian tech-reps, who were often indispensable. They represented, among others, Grumman, Lycoming, Hamilton, Collins, Martin-Baker, General Electric, Singer, Motorola, Marconi and Ryne.

This has been a brief background of the 23d SWAD/73d SAC that merits being told for posterity's sake. Practically no one from that period is around these days. It's probably true that you'll never see any stories titled *Army Aviation's Fixed Wing Exploits in the Republic of South Vietnam* or *How The Bird Dog Made the World Safe for Mankind*. On the other hand, try to remember, when's the last time you saw a Cobra do a Cuban-eight?

At the Aerial Gunnery School, Naval Air Station, Jacksonville, FL, a view from number two aircraft as flight starts turn to final for 360-degree overhead break for landing.

MONTHLY WRITING AWARD

AVIATION MEDICINE REPORT
Office of the Aviation Medicine Consultant

AVIATORS AND ALCOHOL: A Personal Experience

by an Anonymous Army Aviator with a history of alcoholism and

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Sharing personal experiences is educational and, at the same time, disturbing to one's ego. We see reflections of ourselves in the errors in judgments of others. We struggle with the reality that we can be caught up in the whirlpool of life's more unpleasant aspects without warning or as a result of our own denial. Sometimes when a friend needs our help, we look the other way, hoping the same fate will not afflict us. This interview is an insightful look back at how consumption of alcohol, an addicting drug, changed a man's life. This person is an Army aviator, perhaps even a friend of yours or just like a friend of yours. This interview is with an open and honest man.

Dr. Mason: When did you begin to understand that alcohol consumption was becoming a problem for you?

Aviator K.: A couple of years ago, I went through an alcohol rehabilitation program. Just before that, probably for 2 years, I realized my use of alcohol was becoming a problem at home as well as on the job. My wife and I were fighting more and more about my late night happy hours and weekend hangovers. I lost interest in family events. My children and wife turned away from me. On the job, I started to have problems working with my peers, and I knew my performance level was dropping.

Even though my boss did not detect it, my use of alcohol was becoming a problem. After a very late evening of drinking and getting into a fight with one of my coworkers, I realized I just could not

continue drinking the way I had been for the last few years. That night, with blood on my face from the fight and arriving home to an upset wife, I decided the time had come. The next day I referred myself to the treatment center.

Dr. Mason: How did you feel when you first referred yourself for treatment of your alcohol-related disorder?

Aviator K.: The next day as I was going through the paperwork, the phone calls and the logistics of getting into the program, I felt relieved I had finally made the decision to correct my problem. I was ready to learn how to drink socially. Once I got into the program, they told me I would never be able to drink again. I was disturbed for probably the first 2 or 3 days. I just couldn't believe that would ever happen. But after going through a 28-day program, being introduced to Alcoholics Anonymous (AA) and learning some things about myself—I slowly realized and understood the problem of alcoholism. That is, the only drink I have the power to say no to is the first drink.

After the first drink, I have no control over my drinking. The change was hard to accept. I knew it would be a challenge, but that's what AA is all about.

Dr. Mason: What were your thoughts when you first completed the alcohol treatment program?

Aviator K.: During those 28 days, I achieved the first 28 days of sobriety I probably had since I was 16 years old. I was excited. When I walked out of the treatment center to go home though, I was scared. I no longer was in the safe bounds of the treatment center and now maintaining my sobriety was totally up to me. The first steps I made were to get into a local AA support group and to get a sponsor. Then I talked with my wife about my feelings. She was very supportive because, believe me, she wanted my sobriety as much as, if not more than, I.

Dr. Mason: Did you ever feel you could go back to controlled or limited drinking of alcohol?

Aviator K.: When I got out of the treatment center, I felt fairly confident in the new sobriety I had gained—along with what I had learned in the treatment center about myself, the disease of alcoholism and AA. However, in the back of my mind, I had this nagging little question: Could I really go for the rest of my life without drinking again? Was this all really just the result of irresponsibility or was I truly diseased like I had learned? About 4 months after I got out of the center, I started tapering off from my AA meetings. Instead of going 4 or 5 times a week, I dropped off to 2 or 3 and eventually 1 night a week. Then I didn't go for about a month, which led into the Christmas holidays and all those reasons to celebrate.

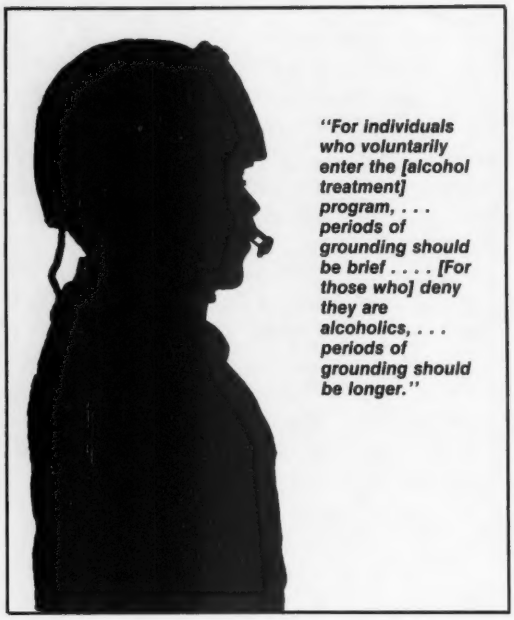
Yes, I started drinking again and desperately hoped I could control myself. It took me about 6 weeks to realize everything I had learned about alcohol abuse and the disease was all true. I was truly an alcoholic. I decided to quit again. I got back into AA. I now have more than a year and one-half of sobriety. I fully understand just how powerful the disease is and I cannot drink again.

Dr. Mason: How long do you feel an aircrewmember should be grounded during the initial phase of alcohol rehabilitation?

Aviator K.: Well, I think that is a tough question that has to be handled on an individual basis. Alcoholism is such a powerful disease in the way it works on the subconscious. However, after going through my ordeal and learning how it affected me, I think there needs to be some trial period of grounding. For individuals who voluntarily entered the program, the periods of grounding should be brief times during the initial phases of their treatment programs. For individuals who are referred into the program or who tend to deny they are alcoholics, the periods of grounding should be longer. Depending on their recovery and circumstances, different timeframes should be developed for different individuals.

Dr. Mason: What is the importance of continuing in an active sobriety program such as AA?

Aviator K.: In my opinion, the only way an alcoholic maintains abstinence or sobriety is through the lifelong continuance in a sobriety



"For individuals who voluntarily enter the [alcohol treatment] program, . . . periods of grounding should be brief . . . . [For those who] deny they are alcoholics, . . . periods of grounding should be longer."

program; a 12-step program such as AA; or perhaps a church that has a similar program. The disease of alcoholism is ever present subconsciously. People who get away from the support group of AA or a similar program tend to forget the reasons why they entered the program in the first place. They fall into the trap that I did, thinking maybe they really aren't diseased. So to maintain sobriety, I feel that alcoholics staying in a program is important.

Dr. Mason: What do you see as the key to prevention of alcohol-related disorders?

Aviator K.: Considering what I learned in the program and what I have seen in myself, I strongly believe I was born an alcoholic. I remember when I was a child of 5, 6, 8 years old, my parents and relatives got together and drank beer. I stood around and asked my father or anyone for a taste of beer. I loved the taste. I loved the feeling I got, even at that young age. I was 14 the first time I got drunk, really drunk. I drank until I could not stand up. I could barely crawl. I got sick. I continued to drink afterward just because I liked the feeling, the buzz that was going through me.

I would say individuals who question whether or not they are alcoholics should practice abstinence. They may be able to abstain on their own. But if not, they may need to consider getting into a program. Abstinence is the only way to prevent alcohol abuse.

Dr. Mason: Why do people drink to the point of becoming dependent on alcohol—that is, why are you an alcoholic and others are not?

Aviator K.: First, I am not a doctor, but what I am saying is very basic and accurate as I understand it.

The reason why some people are alcoholic and others not has been an issue studied by universities and medical agencies. These medical people attribute alcoholism to a chemical imbalance of hormones, called endorphins and enkephalins. This imbalance is present at birth or can be brought on by long-term heavy drinking or prolonged stress. They can diagnose alcoholism with 100 percent accuracy on any dead person by cutting open the brain and looking for TIQ, a by-product of ethanol. During a drinking session, a person's liver turns alcohol into something similar to vinegar, which is dissipated through the sweat glands, urine and breath until that person sobers up. When an alcoholic drinks, the body goes through the same process, except for TIQ. TIQ attaches itself to the brain receptors where endorphins and enkephalins are normally found, and TIQ stays there. Over the years, TIQ builds up into larger quantities. The more the chemical is on the brain, the more of a compulsion one has to keep drinking once that person starts a drinking session. It controls the amount one consumes. This is why alcoholics progressively get worse with their drinking habits over time, usually a period of years.

Genealogical studies have identified that alcoholism clusters in families, but alcoholism does not occur in every generation. In my case, I am the

oldest of nine children and I am the only one of my brothers, sisters and parents who is alcohol dependent. But I do have other relatives on my mother and father's side who were alcohol dependent. I pray my children won't be, but there is no definite pattern as to who will get it in a family where it has been identified.

Dr. Mason: In summary, do you have any closing comments to fellow aircrewmembers?

Aviator K.: Yes, and this applies to anyone, not just aircrewmembers. I suspected I had a problem and finally, after much hardship, had to take care of my problem. Now that I have been in the program for a while, been sober and the fear of not taking a drink again is gone, there has been a 100 percent improvement in my lifestyle. I am not afraid of going places anymore where there is no booze. The people I have met in my support group are the best friends I have ever had. They all have the same problems I have had. There is a common bond among the people who are helping themselves recover from this disease. I don't miss alcohol at all. It just takes acknowledging you have a problem and the desire to stop, to beat it. Once you do beat it, you will fall in love with yourself again. You will get back your self-esteem. Your family and social life improves almost daily. I suggest anybody who is thinking or has that little question "Do I have a drinking problem?" in the back of their mind, probably do. Help comes very easy—you just have to make a decision to ask for it.

The U.S. Army Aeromedical Center, Ft. Rucker, AL, and the waiver authorities at the U.S. Total Army Personnel Command, Alexandria, VA, and the National Guard Bureau, Washington, DC, actively support the return of aviators with a history of successful alcoholism rehabilitation to full-flying duties. The period of grounding is individually tailored to the progress of each aviator and ranges from 3 to 18 months. Those who voluntarily present themselves for care are usually returned to full-flying duties in less than 6 months.

Our guest aviator in this article was grounded for 5 months and is currently flying Army aircraft without restrictions. The U.S. Army Aeromedical Center is working with the waiver authorities to reduce some of the administrative requirements that prolong the current period of grounding. The goal is to develop an effective treatment program for aviators with a minimum period of grounding.

The current policy is as follows: Aviators with a medical diagnosis of alcohol abuse or dependence are disqualified and require a waiver to return to full-flying duties. A waiver will be recommended when the aviator does the following: initiates successful participation in a drug and alcohol treatment program; abstains from the use of alcohol; makes a commitment to an active, ongoing sobriety program, such as AA; and submits letters of support from the treating program director, local flight surgeon and the chain of command. A majority of aviators disqualified for alcohol abuse or dependence have met these requirements and are currently flying, maybe even in the seat next to you.

The Aviation Medicine Report is a bimonthly report from the Aviation Medicine Consultant of TSG. Please forward subject matter of current aeromedical importance for editorial consideration to U.S. Army Aeromedical Center, ATTN: HSXY-ADJ, Fort Rucker, AL 36362-5333.

Microburst—A deadly weather phenomenon

A few short years ago, the term "microburst" was not a part of most people's vocabulary. On 9 July 1982, that changed dramatically when a Boeing 727 crashed at New Orleans International Airport, killing 145 people on the airliner and 8 others on the ground. Then on 2 August 1985, a Lockheed L1011 on approach to Dallas/Ft. Worth International with 163 people on board entered a quickly developing thunderstorm, attempted a go around, struck a hill and crashed onto a state highway, claiming 134 lives, including 1 person on the ground. Investigation revealed both these aircraft were victims of microburst induced wind shear.

Primarily because of these accidents, microbursts have become a part of our national weather consciousness, taking their place alongside other such violent weather phenomena as tornadoes and hurricanes.

Although, as its name suggests, a microburst is small—1 to 3 miles laterally—and of short duration—5 minutes or less—it can be lethal, particularly to aircraft during the landing and takeoff phases of flight. The lateral wind shear produced by a microburst can result in a switch from a headwind to a tailwind of as much as 50 knots.

Microbursts are extremely difficult to detect, and conventional weather radars cannot be relied on as a means to detect and avoid them. A 1982 Joint Airport Weather Study of the Federal Aviation Administration's low-level wind shear alert system in use at some major U.S. airports indicated the system was not effective in detecting microburst wind shear (MBWS). This was true primarily because the surface sensors were spaced too far apart, allowing the small, highly transient microburst to pass undetected between the sensors. Terminal Doppler radars, which are built and operated for the primary purpose of wind shear detection, have the capability to detect developing microbursts. However, the high cost of this radar system makes it an unlikely candidate for implementation at a large number of airfields in the near future. Most Doppler radars currently in use, and those that will be fielded in the 1990s, are used for severe storm surveillance and have only a secondary capability to spot microbursts.

A high percentage of microburst related mishaps and incidents have occurred during June, July and August, between the hours of 1400 and 1900. In every case, thunderstorms or intense convective activity were in the area. And almost without exception, there existed some known precursor event or warning of impending danger. For example, a Learjet that immediately preceded the L1011 at Dallas/Ft. Worth encountered wind shear on approach. The pilot told investigators that he did not report the apparent wind shear because he had his hands full trying to recover from a 25 knot loss in airspeed and a rapid loss of altitude during approach. His plane had not completely cleared the runway before the L1011 crashed. If the pilot of the Learjet had been able to report his encounter with wind shear to air traffic control personnel, there is a possibility that the crash of the L1011 might have been averted.

Although much has been written in the past few years about microbursts and their effect on flight, most of the information has been directed toward fixed-wing aircraft, particularly large commercial aircraft. However, while attending the Air Force Command and Staff College, Major Eugene E. Mace, an Army aviator, prepared a report on microburst induced wind shear that, in addition to exploring the history of MBWS detection, also includes special considerations of helicopter operations in relation to microburst induced wind shear. The following information has been extracted from that report.*

*LTC Eugene E. Mace retired from the Army in January of this year. He is presently flying for Northwest Airlines.

Helicopter Operations in a Microburst Environment

MICROBURST WIND wind shear is hazardous to helicopters for basically the same reasons it's hazardous to fixed-wing aircraft. It affects both types of aircraft by a systematic loss of lift that occurs following downdrafts and tailwind conditions, which are undetected by the crew until the aircraft has penetrated the wind shear. The majority of MBWS could be handled by most aircraft at altitude (above 1,000 feet); however, encounters below 500 feet above ground level (AGL) can pose a significant hazard to any kind of aircraft, including helicopters.

Admittedly, no documented research has been conducted dealing specifically with helicopters and MBWS; however, a report by the Committee on Low Altitude Wind Shear and Its Hazard to Aviation stated, "Wind shear represents a hazard to all aircraft, ranging from small general aviation aircraft to swept wing jet transports."

In one incident, a helicopter was in cruise flight at 1,200 feet when it encountered a localized heavy rainshower. The aircraft rapidly lost 600 feet of altitude even though the crew held maximum continuous power. The loss of altitude was attributed to the rapidly flowing column of air of a descending microburst. Although this crew had sufficient altitude in which to arrest the helicopter's descent, that may not have been true if it had been engaged in terrain flight.

Although the effects of microbursts on helicopters would not be identical to those on fixed-wing aircraft, they should be similar since both move airfoils through the atmosphere to create lift and both have the same three axes of motion (pitch, roll and yaw). The most critical aspect of loss of lift situations involving fixed-wing aircraft is a sudden degradation of airspeed that corresponds to a drastic loss of lift and altitude. Any decrease in airspeed, such as that experienced in a sudden tailwind condition, results in a corresponding loss of lift if all other values remain constant. Helicopters similarly are affected by tailwinds, especially if they are at or near their power limits. In addition to the loss of lift that accompanies the tailwind condition, the downflow in the center of the microburst also contributes to the overall loss of lift. This occurs because as the aircraft enters the downflow, it pitches over, which decreases the angle of attack.

Effects on Fixed-Wing Aircraft

The following step-by-step discussion of an airplane penetrating a microburst while on final approach and immediately after takeoff will help in understanding exactly what happens and why it happens. It will also provide a basis for understanding how the same principles apply to a helicopter under the same conditions:

Encounter on final approach (figure 1). As the airplane approaches the initial outflow of the microburst, an uncommanded increase in airspeed and angle of attack initially causes the plane to pitch up and climb (a). In response, the pilot reduces power and angle of attack to remain on his approach path. Those descent rates are now aggravated as the airplane encounters the downdraft portion of the microburst, which further reduces the angle of attack and increases the descent rate (b). The aircraft now encounters the tailwind outflow segment, which again decreases the angle of attack and effectively reduces the indicated airspeed (IAS), causing a further reduction in lift (c). At this point, depending on the altitude, the only hope for recovery is to add maximum power and increase the angle of attack to the maximum lift condition. Unfortunately, a common mistake made by pilots at (c) is to lower the nose of the aircraft to regain the reference airspeed, which may, de-

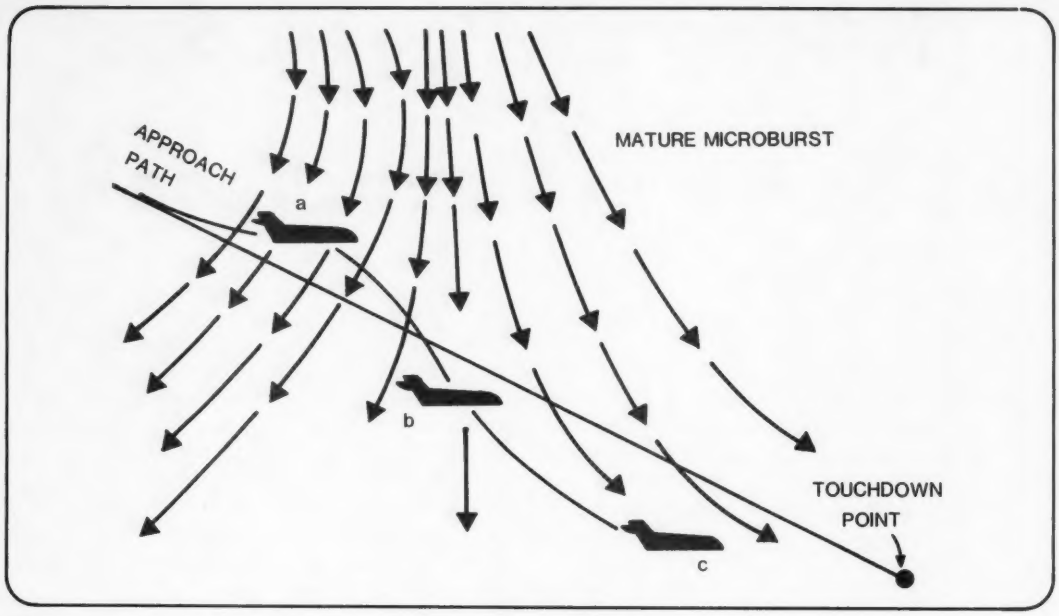


FIGURE 1: Microburst encounter by fixed-wing aircraft during final approach.

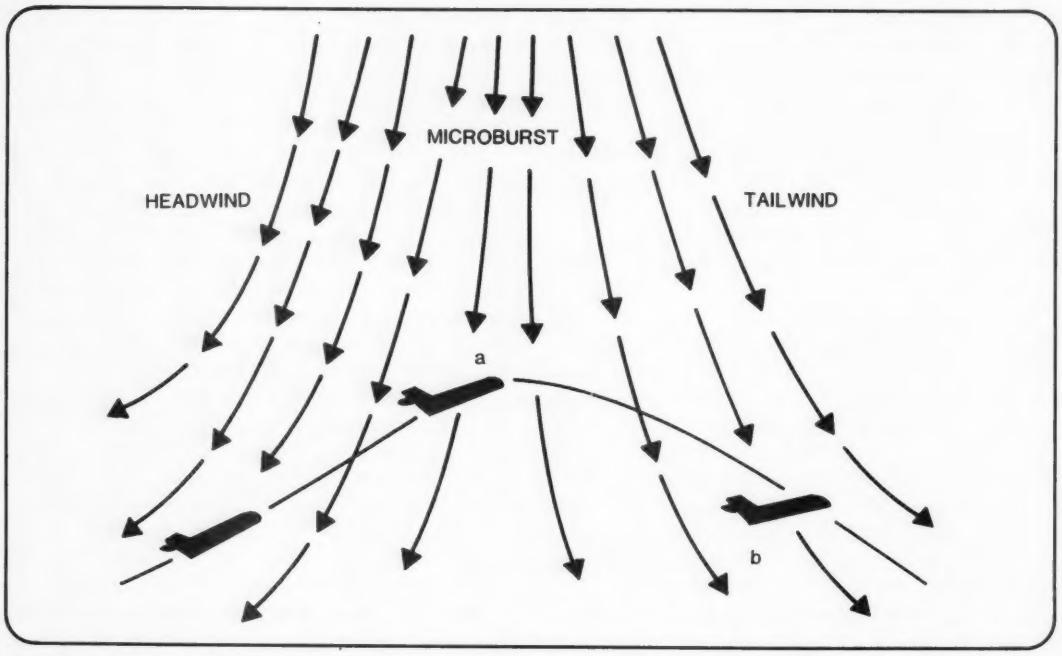


FIGURE 2: Microburst encounter by fixed-wing aircraft immediately after takeoff.

pending on the aircraft's altitude, make recovery impossible.

Encounter immediately after takeoff (figure 2). Immediately after takeoff, an airplane's power and angle of attack are much closer to the maximum limits than in the previous situation. For this reason, a severe microburst may be more than the airplane can overcome, as was the case of the 727 in New Orleans in 1982. In the following situation, the airplane has just taken off and encounters the downburst segment of the microburst (a). As in the previous example, the airplane will lose lift because of a decreased angle of attack followed by a further reduction of lift due to a loss of airspeed as the aircraft passes through the center of the microburst into the tailwind outflow segment (b). Depending on the actual altitude at which the airplane encounters the microburst and the height of the terrain and obstacles, the pilot's only chance for recovery rests with an immediate recognition of the problem at or before (a). This was portrayed graphically in the New Orleans accident when the 727 encountered the shear at 163 feet about 6 seconds after takeoff. In a matter of seconds, the 727 lost 110 feet of altitude and airspeed decreased from a maximum of 162 knots 47 seconds after takeoff down to 144 knots 54 seconds after takeoff. Even though the 727 was climbing at approximately 361 feet per minute when it first impacted a 52-foot tree, it was descending more than 1,200 feet per minute just 5 seconds before the first impact. In his investigation of the accident, Dr. T. Fujita, Department of the Geophysical Sciences, University of Chicago, determined that "the loss of altitude inside the microburst was attributed two thirds to the tailwind and one third to the downflow."

Effects on Rotary-Wing Aircraft

In either of the two previous conditions, a helicopter would be affected in a similar manner because the same basic aerodynamic principles apply. What is not known is to what degree the same microburst would have affected a helicopter.

When comparing the effects of microburst wind shear on the two different categories of aircraft, the following factors, as a minimum, should be considered:

Stability. In the case of nonstability equipped airplanes and helicopters, the airplane would tend to be affected the least by microburst conditions due to inherent stability. However, many modern helicopters are equipped with stability augmented systems capable of providing artificial dynamic stability. These systems, along with built-in design factors, reduce helicopter crew workloads to about the same as those experienced by airplane pilots. For this reason, microburst conditions would have almost the same effect on both categories of aircraft.

Power application response time. Some airplanes, particularly those powered by jet engines, have a very apparent lag time from throttle movement to engine response. In the case of a microburst encounter at traffic pattern altitudes, this lag time may be critical. Helicopters, on the other hand, are operated at full throttle (governor controlled) throughout the normal flight envelope with power linked directly to the rotor blades (angle of attack). In other words, when a helicopter pilot adds or decreases collective pitch to change the rotor blades' angle of attack, the engine power (torque) is reset at the same time. In most situations, power applications up to maximum limits cause no perceivable engine droop, and response is almost instantaneous with collective movement. As a result, the helicopter, with all other conditions equal, would seem to have an advantage over fixed-wing aircraft.

Stall characteristics. The helicopter, by virtue of its whirling rotor blades (which are maintained at a constant velocity by a governor), is capable of reducing its forward speed to zero without stalling. This ability to vary airspeed across a much wider spectrum enables a helicopter to convert airspeed to altitude to a larger degree than an airplane without risking a stall. This capability gives the helicopter pilot greater flexibility when faced with an inadvertent microburst encounter.

Typical mission profiles. A unique characteristic of a helicopter is its ability to hover, and the hover mission serves as the mainstay of helicopter operations. Typical hover missions include terrain flight (including nap of the earth (NOE)), pinnacle and confined-area operations, sling loads and various rescue missions. Since most of these missions occur at relatively low altitudes (below 200 feet AGL) and in close proximity to terrain and obstacles, microburst encounters are extremely critical. In addition to reduced reaction times because of the low altitude, available engine power is also a problem. A helicopter operating at a hover or

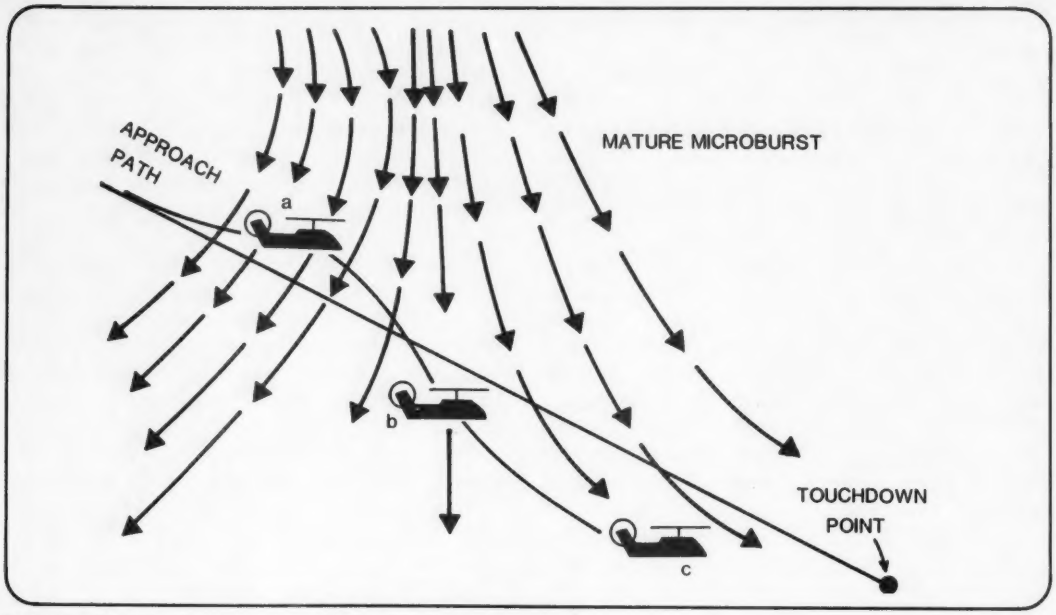


FIGURE 3: Microburst encounter by helicopter during final approach.

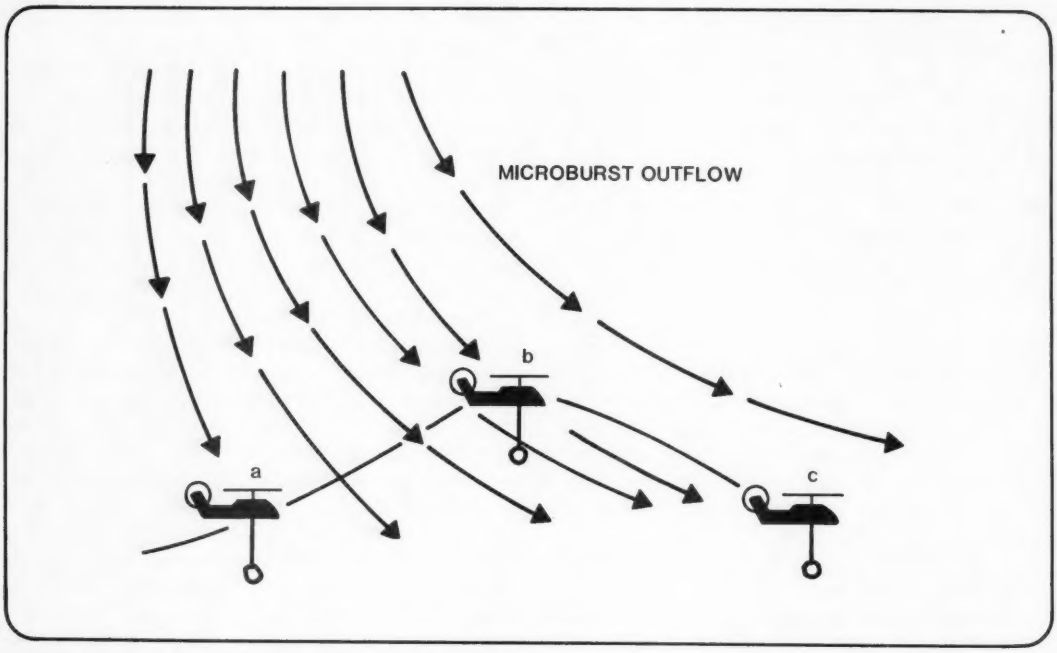


FIGURE 4: Microburst encounter by helicopter during takeoff.

below effective translational lift (ETL) is operating much closer to its maximum allowable power limits. Therefore, it has less of a margin of power to allow it to fly out of critical conditions.

One other factor that could impact on helicopter missions to a greater degree than many airplane missions is the remote areas from which helicopters typically operate. These areas usually are devoid of modern pilot aids such as radar, wind shear indicators or even weather observations.

Following are recommended pilot response actions for three types of microburst encounter:

Situation 1—Encounter on final approach (figure 3). This situation involves a helicopter on final approach. The microburst is located ½ mile from the approach end of the runway and is centered along the approach path. As the helicopter proceeds on final, the initial phases of the approach are normal. The first indication of impending problems occurs when the helicopter enters heavy rain at about 400 feet. The initial outburst winds of 24 to 30 knots will cause the nose to pitch up, along with a corresponding increase in IAS. The established descent rate for holding the glide path will either lessen or the helicopter will actually begin climbing (a). At this point, without prior warning that microbursts were in the area, or without a Doppler radar warning from the ground, it would be highly improbable that any pilot would be able to correctly determine that the initial stages of microburst penetration were beginning. Normal pilot responses would consist of a power reduction and a reestablished pitch attitude to regain the approach airspeed and glide path. As the helicopter approaches 300 feet, it passes through the initial outburst and enters the core of the downflowing microburst (b), which would be perceived by the pilot as a noticeable sinking sensation, with a corresponding descent indication on the vertical speed indicator (VSI). A very apparent pitch-over would also probably occur as the helicopter enters the downflow segment. Once the helicopter passes through the core of the microburst and into the tailwind outflow (c), a drop in IAS would occur, further aggravating the descent and making recovery exceedingly difficult. The combined negative lift effects produced by the downflow and the tailwinds are sometimes too much to overcome. For example, in a real-life case, a 727 was unable to overcome a sudden headwind to tailwind condition that reduced its IAS by 16 knots in 7 seconds, combined with a 22-foot-per-minute downdraft, which caused it to crash 2,400 feet short of the runway. In another instance, an L1011 initiated a missed approach at 400 feet because of the same microburst conditions. The L1011 descended to within 60 feet of the ground before it began climbing. For these reasons, it is imperative that the microburst conditions (sudden increases or decreases in airspeed with corresponding changes in performance) be recognized as early in the approach as possible so that a timely recovery (missed approach) can be conducted. The recovery should consist of maximum power at best rate-of-climb attitude until clear of the downburst conditions.

Situation 2—Encounter immediately after takeoff (figure 4). This situation involves a helicopter engaged in a slingload mission. The takeoff (a) is made in visual flight rules conditions. At about 100 feet, the helicopter encounters rain, which necessitates the use of the windshield wipers (b), but does not enter instrument meteorological conditions. At approximately the same moment, the IAS suddenly drops from 80 to 40 knots in about 5 seconds along with a noticeable sinking sensation with a corresponding descent on the VSI (c). Concerned with the loss of airspeed, the normal pilot response is to lower the nose to regain the lost airspeed. As in the first situation, the recommended pilot response is to apply maximum power and set the pitch attitude on maximum climb attitude regardless of IAS. In the case of flight-director-equipped helicopters, the go-around mode would be invaluable since it could be selected for immediate pitch attitude reference. If the descent cannot be arrested, the load should be jettisoned without hesitation. In this situation, the normal headwind, and to some degree the downburst portion of the microburst, was not a factor because the microburst occurred adjacent to the takeoff point rather than directly in line with the flight path.

Situation 3—Encounter during NOE flight. This situation involves a helicopter engaged in NOE flight. As stated previously, the effects of a microburst on a hovering helicopter are probably more severe than if the helicopter were in forward flight above ETL. The first indication of the impending microburst is a dust cloud about 1 mile to the front, followed immediately by a gusty disturbance in the trees surrounding the helicopter. During the initial outburst portion of the microbust, the helicopter will derive increased lift because of the

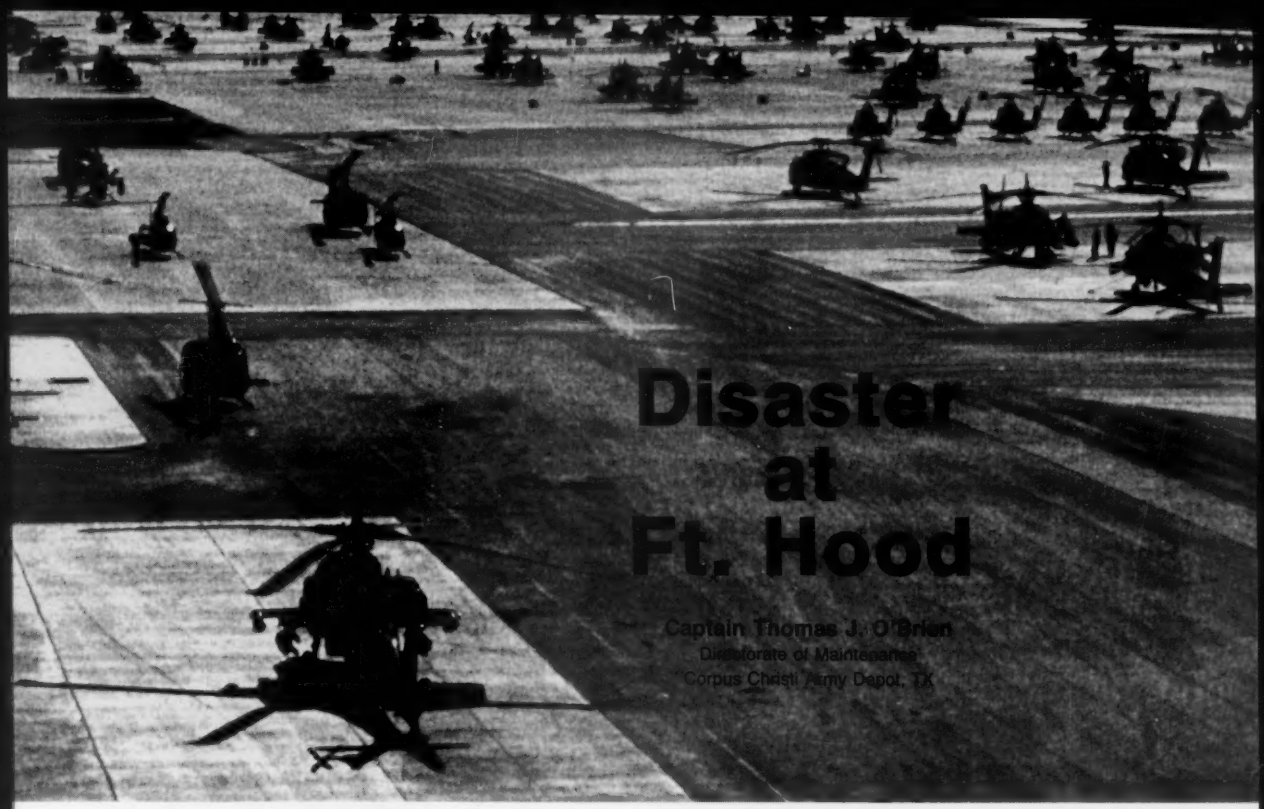
greater efficiency of the rotor system interacting with the outburst winds. The hovering helicopter's IAS will increase in response to the outflow and, depending on the magnitude of the microburst, may pass through ETL while at a hover. This will necessitate a substantial power reduction to maintain a constant altitude and may not be a problem unless the helicopter's flight path continues through the remainder of the microburst. Probably the safest maneuver at this point of the penetration is to land and remain at operating rpm until the disturbance ceases. If a landing cannot be made because of the terrain, an abrupt course change may be best to avoid the core of the microburst. Care should be taken not to expose the helicopter to critical wind azimuths, especially below ETL. The least desirable action would be to attempt to climb out through or along a path parallel to the microburst. This action would expose the helicopter to the full intensity of the wind shear.

Although the preceding is highly speculative, it attempts to describe probable sequences of events with different microburst encounters. In all three encounter situations, early detection of the microburst is important for successful penetration or avoidance to be possible. Aircrews should be especially alert for any danger signal that may provide clues that a microburst encounter is likely. Once microburst contact is suspected (whether on final or during takeoff), maximum power should be applied along with a pitch attitude that provides best rate of climb. In the hover situation, flight through or near the center of a microburst would, in all likelihood, be extremely difficult to cope with because of the relatively close proximity of the terrain. As in the other two situations, early recognition of microburst danger signals increases the pilot's odds of coping with the wind shear or successfully avoiding it. If a microburst is contacted during a hover, every effort should be made to land. If a landing is not possible, the center of the microburst should be identified and avoided. No attempt should be made to climb out through the center of the microburst.

Do microbursts present a danger to Army Aviation operations, or do Army pilots simply "stay on the ground" when conditions exist that might produce this kind of weather phenomena? Although there has been progress in detection, microburst encounters can still happen.

In April 1986, an Army U-21 Ute was approaching Atlanta International Airport. The tower reported wind shear, but the aircraft was already on short final and committed to touchdown. It encountered severe wind shear, causing it to touch down left-wing low, allowing the propeller blades of the left engine to hit the ground. Fortunately, the only damage was to the propeller blades.

Last year's wind damage to Army aircraft at Ft. Hood, TX, Ft. Polk, LA and Eastover, SC, and this year in Germany makes it clear that nature still holds the winning hand even when aircraft are on the ground and presumably safe. Being prepared for severe weather, particularly during the spring and summer months, is the best way to avoid being caught in situations that can destroy aircraft and possibly take the lives of crews as well.



Disaster at Ft. Hood

Captain Thomas J. O'Brien
Directorate of Maintenance
Corpus Christi Army Depot, TX

AH-64 Apaches at Hood Army Airfield.

ON 13 MAY 1989, a severe weather phenomenon known as a *Mesoscale convective complex* occurred at Ft. Hood, TX. Two hundred and forty-five unhangared aircraft were exposed to nearly 100 miles per hour (mph) winds.

The post's aviation community initially estimated damage to 200 aircraft. Eyewitnesses described CH-47D Chinooks and AH-64 Apaches turned upside-down, and main rotor blades snapped or bent like toothpicks. This storm was the most catastrophic peacetime event in Army Aviation history. It hit so suddenly that one AH-64A crew was rolled onto the side in their helicopter while attempting to shut down, and had to be rescued by ground crews.

U.S. Army Aviation Systems Command (AVSCOM) personnel quickly determined that damage exceeded the capability of Ft. Hood to evaluate, and requested depot assistance. Officials at Corpus Christi Army Depot (CCAD), TX, reacted immediately. An advance party arrived 14 May to provide an initial assessment. The remainder of the team arrived and began work on 15 May.

The team was comprised of 15 civilian pre-shop analysis technical inspectors (WG-11), officer-in-charge Captain Thomas J. O'Brien and III Corps/CCAD liaison officer CW2 Larry Simone. The inspectors had an average experience level of 20 years in aircraft maintenance.

Planting the CCAD Flag

The advance party arrived by automobile around 1600 hours, 15 May. They confirmed initial estimates of the damage. U.S. Army Materiel Command (AMC) personnel tasked the team (as members of an AVSCOM task force) to provide any assistance required to reconstitute III Corps/Ft. Hood's aviation assets. The AVSCOM task force was comprised of the CCAD team,

AVSCOM logistics assistance representatives (LARs), engineers from AVSCOM Directorate of Engineering, and technicians from AVSCOM Directorate of Maintenance—a total of 50 personnel.

The Task at Hand

All exposed aircraft had experienced a catastrophic event and required safety-of-flight inspections. In addition, AVSCOM required an accurate estimate of the damage and a projected repair cost as soon as possible.

To accomplish this, AVSCOM approved combining an estimated cost of damages (ECOD) and a special inspection into one document. AVSCOM combined the two functions to save time and paperwork.

Inspectors performed a special inspection to determine airworthiness of all aircraft exposed to the storm, including those with no visible damage, before release back to owning units. When the inspection revealed damage, technicians determined the necessary repairs and cost estimates of those repairs.

Developing Storm Damage Inspection Criteria

Before the Ft. Hood disaster, formal special storm inspection criteria for storm damage this extensive was almost nonexistent. The CCAD team provided expertise in developing special inspection criteria in conjunction with AVSCOM Directorate of Engineering.

The inspection was based upon CCAD aircraft induction inspections or pre-shop analysis standards and experience with similar but less severe damage. It incorporated some aspects of hard landing and sudden stoppage inspections contained in existing aircraft maintenance manuals (figure 1).

AH-1 Cobra helicopters rest on their rotor blades after being flipped over in a 17-second windstorm that neared 100 miles per hour.

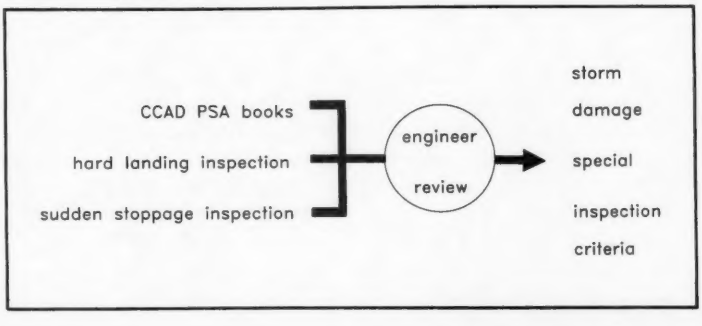
The engineers developed a progressive inspection. The more damage uncovered during the inspection, the more extensive the inspection became. Indication of damage on one component required inspection of the interconnecting components. The inspectors made use of nondestructive inspection techniques such as florescent penetrant and ultrasound. The engineers altered the criteria as the inspection team completed more inspections and collected more hard data.

Limited CCAD and AVSCOM engineering experience with the AH-64A slowed the development of AH-64A special inspection criteria. McDonnell Douglas Helicopter Company and the Apache fielding team provided much of the technical information and expertise for development of the inspection criteria.

Inspection of Aircraft

The AVSCOM task force initially classified all damaged aircraft into three categories, based

FIGURE 1: Inspection criteria.



- AVSCOM logistics assistance representatives (team chief)
- Maintenance technician (warrant officer)
- Unit technical inspector
- Corpus Christi Army Depot aircraft inspectors (2)
- Contractor field service representatives
- Other MACOM logistics assistance representatives as required (CECOM, MICOM, AMCCOM)

FIGURE 2: Estimated cost of damages team structure.

1. Aircraft inspected by team.
2. Work copy submitted to CCAD supervisor. Supervisor reviews work copy and prepares for AVSCOM engineer.
3. Copy submitted to AVSCOM engineer for review and signature.
4. Aviation intermediate maintenance technical inspectors look up prices and stock numbers. Estimated cost of damages typed and researched.
5. CCAD supervisor reviews.
6. AVSCOM engineer reviews and signs.
7. Copy given to AVSCOM logistics assistance representative.
8. Copy given to aviation intermediate maintenance production control. DA Form 2407, Request for Estimated Cost of Damages, closed out.
9. Estimated cost of damages given to unit. If it goes to a aviation unit maintenance, repair will commence; if it goes to the depot, a request for disposition will be submitted by the unit to AVSCOM through the logistics assistance representative.

FIGURE 3: Estimated cost of damages process.

on the severity of the damage. This provided a structured approach to the inspection effort. Category I aircraft had limited damage; category II, moderate damage; and category III, major damage. The team began with category I aircraft.

The III Corps/Ft. Hood commander determined the order in which the team inspected the units as well as the type of aircraft inspected first. An inspection team was organized for each type of aircraft (figure 2). Each team included an AVSCOM LAR who served as team chief, an Army aircraft technical inspector from a local unit, an Army warrant officer maintenance technician from a local unit, two CCAD aircraft inspectors and, when required, a contractor field service representative.

Other major Army command LARs (Communications-Electronics Command, Armament Munitions Chemical Command, Missile Command) joined the teams as necessary. Units submitted requests for inspections through normal maintenance channels to their supporting aviation intermediate maintenance (AVIM) production control.

The inspection process used the established maintenance structure as much as possible. Units were notified, through their AVIM production control, 1 day before inspection to prepare the aircraft by removing panels or assemblies.

After the team inspected each aircraft, AVSCOM engineering reviewed the working copy of the inspection (figure 3). Then, a team of technical inspectors edited the work copy, researched cost data and national stock numbers and finalized the completed ECOD/special inspection and estimated costs of damages.

An AVSCOM engineer and the AMC task force commander signed the finished product and released the aircraft back to the unit for corrective action. The task force distributed completed copies of the ECOD/special inspection to the owning unit through the supporting AVIM production control. Upon completion of the required actions, the unit performed a maintenance operational check and a maintenance test flight on the aircraft.

The Result of the Damage Assessment

The task force inspected 245 aircraft at Ft. Hood in only 20 days. This included 25 OH-58 Kiowa, 54 UH-1H Huey, 16 UH-60A Black Hawk, 25 AH-1 Cobra, 13 CH-47D and 111 AH-64 aircraft. Inspectors worked 14 hours a day, 7 days a week. Much of the credit goes to the permanent Ft. Hood aviation maintenance community who came in before dawn each day

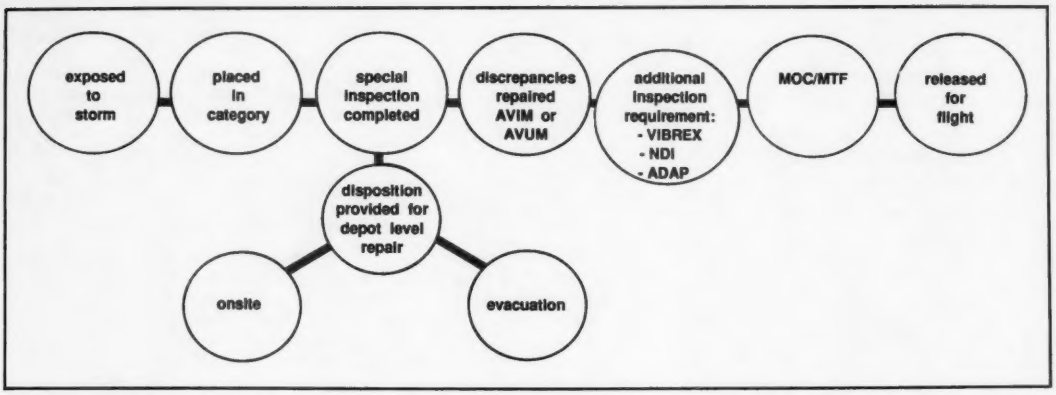


FIGURE 4. Aircraft repair cycle.

and put in many long hours to prepare the aircraft for inspection. Unfortunately, the repairs took much longer.

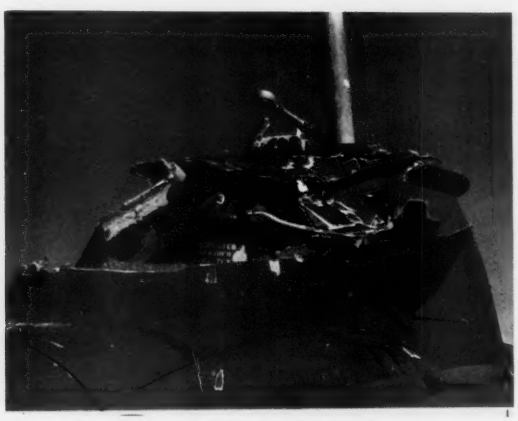
With accurate ECODs, AVSCOM Directorate of Maintenance provided owning units with disposition instructions, where the aircraft repairs would occur and who would conduct the repairs. Units completed most aviation unit maintenance/AVIM repairs, and AVSCOM coordinated the evacuation or onsite repair of depot discrepancies (figure 4). AVSCOM consolidated the cost of the repairs and provided the information to the Department of the Army.

No damage was found on 50 of the aircraft, which were inspected, test flown and released. The remaining 195 aircraft required minor to major repairs. About 15 of the aircraft were sent to CCAD for repair. Several more may be sent in the future. Many of the repairs were sent to civilian contractors; however, soldier mechanics at Ft. Hood repaired most of the aircraft. The estimated cost of the damage is more than $150 million.

Conclusion

Working together, CCAD, AVSCOM and the Ft. Hood aviation community developed a systematic approach to assessing the damage caused by the storm on 13 May 1989. The task force accomplished the assessment ef-

Blades strong enough to lift the helicopter are bent like straws after the 17-second wind storm.



The wind flipped this helicopter over and tore the skin off the aircraft.

fort in a minimum amount of time. The recovery effort developed into one of the most extensive logistical operations ever conducted by the Army Aviation maintenance community.

As a member of the AVSCOM task force, the CCAD team assessed the aircraft damage as thoroughly and expeditiously as possible. Their actions showed the ability of a depot to react anywhere in the United States within 24 hours to support soldiers in the field. CCAD demonstrated the ability to develop innovative procedures and adapt experience to new situations.

A CH-47 Chinook rests on its side at Ft. Hood. In spite of being chained to the ground, the force of the storm ripped the tiedowns out of the concrete.

Epilogue

Disaster struck Army Aviation twice more in the summer of 1989. On 7 June 1989, high winds in excess of 75 mph occurred at Ft. Polk, LA, and resulted in damage to 58 aircraft, which belonged to the 5th Infantry Division (Mech). Within 24 hours, a nine-member CCAD assessment team arrived at Ft. Polk and began work immediately. A reconstituted AVSCOM task force, using the same procedures used at Ft. Hood, inspected 58 aircraft (27 UH-1H, 16 AH-1, 14 OH-58 and 1 UH-60) in only 7 days. Of that total, 16 aircraft were found to have no damage. Forty-two required minor to major repairs. Estimated cost of damages exceeded $10 million.

Members of the Corpus Christi Army Depot team pause for a photo at Ft. Hood. The author, Captain Thomas J. O'Brien, stands at center (with hands on hips).

Unbelievably, on 16 June 1989, another severe storm struck Army aircraft. A two-member CCAD assessment team, again part of an AVSCOM task force, inspected 16 AH-64A aircraft at McEntire Army National Guard (ARNG) Facility, SC. The aircraft belonged to the 1/151 Attack Helicopter Battalion, South Carolina ARNG. The team found no damage on seven of the aircraft. Nine aircraft had minor to major damage.

The response to these peacetime disasters again showed that Army Aviation personnel at all levels can adapt and, in short order, assess and resolve a crisis. This is an exciting time to be in Army Aviation maintenance. These incidents became an important training vehicle that could not have been simulated with the same effectiveness. In overcoming adversity, we established new doctrine and are better prepared for potential wartime disasters.

ATC FOCUS
U.S. Army Air Traffic Control Activity

Special Requirements for Flight Inspection Aircraft

Master Sergeant Thomas Guthrie
U.S. Army Air Traffic Control Activity
U.S. Army Aviation Center
Fort Rucker, AL

"MURRY TOWER, this is flight check four-three. Over."

"Flight check four-three, this is Murry Tower. State intentions. Over."

"Murry Tower, flight check four-three requests special handling to do a periodic flight check of your instrument landing system."

WE ALL KNOW THAT the primary function of air traffic control (ATC) is to provide safe and expeditious air traffic movement. To effectively accomplish this mission, air traffic personnel use prescribed procedures and phrases identified in Federal Aviation Administration Handbook (FAAH) 7110.65. ATC personnel must know operational requirements in the handbook.

Normally, air traffic services are provided to aircraft on a "first come, first serve" basis, but with exceptions. Chapters 2 and 8 of FAAH 7110.65 identify specific aircraft having operational priority and special handling requirements. Flight inspection aircraft engaged in the inspection of terminal navigational aids (NAVAIDs) require special handling and must receive maximum assistance. This assistance reduces the impact on normal operations and expedites flight inspection requirements.

Many flight inspection requirements are done by automated recording equipment. An uninterrupted flight allows for successful recording of navigational equipment data to determine operability of the NAVAID. Aircraft that fly between the inspected NAVAID and the flight inspection aircraft can degrade the collected data. Personnel use data to determine equipment performance. Interruptions during data collection require the process be repeated. A call sign "flight check four-three recorded" indicates that an automated flight inspection recording is in progress.

To effectively accomplish flight inspection requirements, ATC personnel are required to coordinate inter and intra facility procedures to adjust air traffic flow. Standard maneuvers and phraseology have been developed to minimize the impact on normal operations. FAA Order 8240.41, Flight Inspection/Air Traffic Coordination, referenced in chapter 8 of FAAH 7110.65, describes these standard flight inspection maneuvers and associated phraseology.

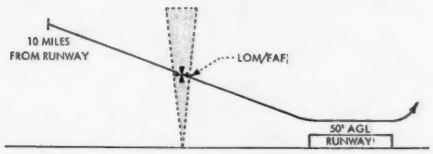
Maneuvers (runs) vary for each inspected NAVAID. The type of inspection, such as commissioning, periodic or periodic with monitors, determines the number of runs and how long normal operations and traffic flow will be interrupted.

In-flight evaluation of terminal NAVAIDs can be time consuming. These aids include instrument landing systems (ILSs), very high frequency omnidirectional range stations, nondirectional beacons, precision approach radars and their associated approach airspaces. Inspection of the ILS normally consumes more time and is more disruptive to the normal traffic flow than the other NAVAIDs. Appendix 1, FAA Order 8240.41, addresses specific requirements and describes the three basic ILS

maneuvers: flight inspection 10-mile arc, flight inspections holding pattern and flight inspection low approach.

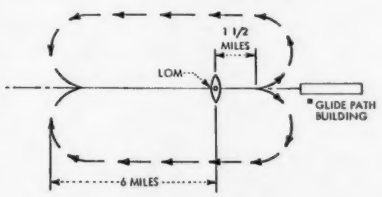
• "Flight inspection 10-mile arc" is the standard phrase that identifies a flight inspection maneuver. The flight inspection aircraft flies this maneuver while the aircraft records performance data from the localizer. This arc maneuver is normally flown at altitudes of 1,000 to 4,500 feet above ground level (AGL) at 10 nautical miles from the localizer antenna. The radiation pattern of the localizer is evaluated 35 degrees on each side of the final approach course. A "small race track pattern" centered around the final approach course is also used to collect performance data (figure 1).

FIGURE 1: Flight inspection of 10-mile arc.
Instrument landing system front or back course



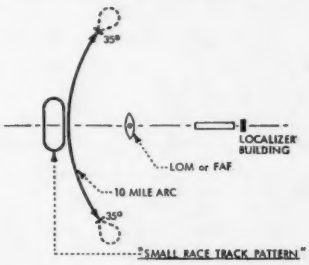
• "Flight inspection holding pattern" disrupts normal traffic flow in two ways. First, the altitude required to perform this flight inspection holding-pattern maneuver may be the normal traffic pattern altitude or the "glideslope intercept altitude" or both. Second, sequence of traffic in the pattern requires adjustment. Data obtained from this flight inspection holding-pattern maneuver determine the operability of the glideslope to provide vertical guidance information. This maneuver is performed only once during periodic inspections but may be performed from 4 to 10 times during other inspections (figure 2).

FIGURE 2: Flight inspection holding pattern.
Instrument landing system front course only



• "Flight inspection low approach" evaluates the glideslope angle and localizer course alignment information. This maneuver requires the flight inspection aviator to maintain the flight inspection aircraft at 50 feet AGL for the full length of the runway. Planning by air traffic services personnel to prevent wake turbulence produced by aircraft is mandatory and essential to flight safety. To prevent interruption of essential data collection during this maneuver, departing/arriving aircraft should not be allowed to fly over the localizer antenna or fly through the final approach course (figure 3).

FIGURE 3: Flight inspection low approach.
Instrument landing system front or back course



Air traffic services and flight inspection missions can be done effectively and safely through cooperation and coordination. An understanding of flight inspection requirements, responsibilities and terminology will enhance mission success and reduce impact upon normal operation. This can be done by orientating and training air traffic users and services personnel.

Copies of FAA Order 8240.41, Flight Inspection/Air Traffic Coordination, are available from the U.S. Army Air Traffic Control Activity, Aeronautical Services Office, ATTN: ATZQ-ATC-AI, Cameron Station, VA 22304-5050, AUTOVON 284-7773 or Commercial 202-274-7773.

For more information, contact the U.S. Army ATC Activity, Systems Evaluation Division, Ft. Rucker, AL 36362, AUTOVON 558-5532 or Commercial 205-255-5532.

Readers are encouraged to address matters concerning air traffic control to Commander, USAAVNC, ATTN: ATZQ-ATC-MO, Fort Rucker, AL 36362-5265.

AVIATION PERSONNEL NOTES

Army/American Council on Education Registry Transcript

Enlisted soldiers and veterans, worldwide, who entered the regular Army for the first time on or after 1 October 1981 are eligible for the Army/American Council on Education Registry Transcript System (AARTS) free transcription service.

This service is one of the newest benefits for enlisted personnel within the Army Continuing Education System. The AARTS celebrated full implementation in July 1987. By the end of 1989, the AARTS Operations Center had issued more than 40,000 requested transcripts to soldiers, veterans, Army education centers and colleges.

The AARTS includes these documents: Army course completions; experience in military occupational specialties; skill qualification test scores; additional skill identifiers; and special qualification identifiers. AARTS also includes scores for college level examination program tests; Department of Defense activity for nontraditional education service subject standardized tests; Scholastic Aptitude Test; and American College Test-Performance Evaluation Program.

In addition to personal use, eligible soldiers and veterans can request AARTS transcripts for use by college registrars, potential employers and Army education center counselors. Veterans find their transcripts valuable as they prepare resumes explaining military experience to civilian employers.

An eligible soldier or veteran may obtain a transcript by submitting a completed DA Form 5454-R or a written request to the AARTS Operations Center. The written request must include the individual's name, social security number, basic active service date, signature and mailing address.

For more information, soldiers can write to the AARTS Operations Center, Ft. Leavenworth, KS 66027-5073, or phone 913-684-4211, AUTOVON 552-4211.

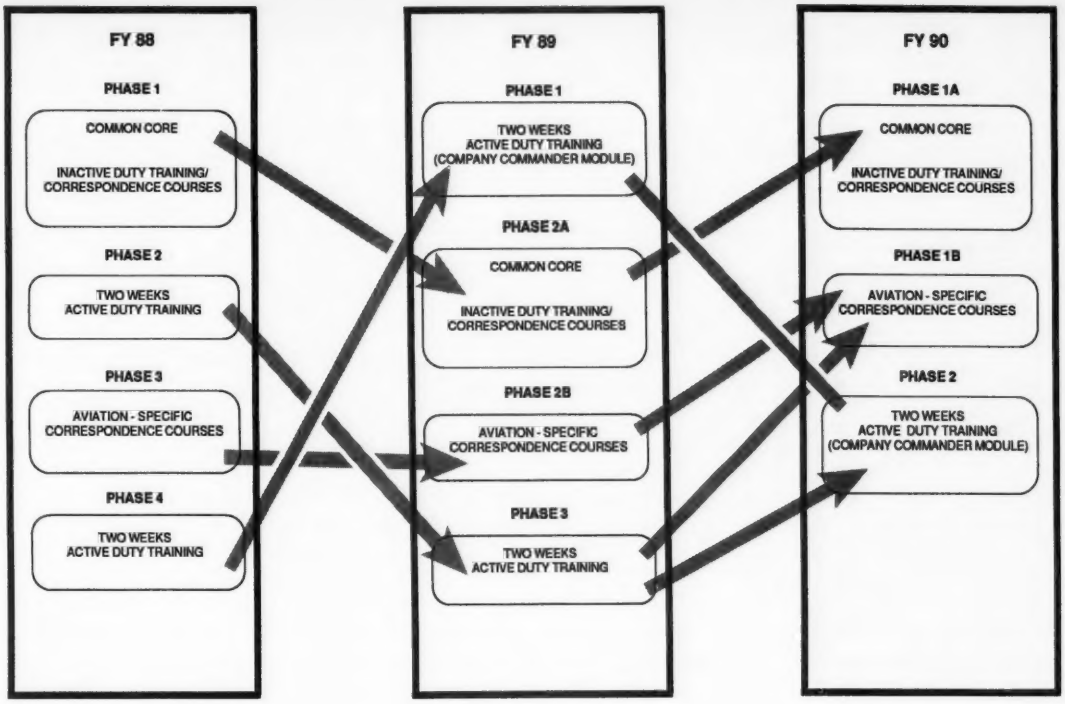
Officer Personnel Management Directorate (OPMD)

The OPMD of the U.S. Total Army Personnel Command (PERSCOM) conducts team trips to installations throughout the year. Normally, the OPMD director, Brigadier General Gary L. Brown, leads the team and conducts an officer personnel update briefing covering current personnel management issues of interest to all officers. Teams normally consist of from 8 to 24 career managers, depending on population density at the visited installation.

Career managers will conduct branch specific briefings and interviews with individual officers. Warrant Officer Division (WOD) will send representatives to posts of warrant officer populations of 100 or more. These planned trips will have WOD team members: Ft. Hood, TX, 22 to 28 July 1990; Ft. Drum, NY, 13 to 16 August 1990; Ft. Lewis, WA, Ft. Ord, CA, and National Training Center, Ft. Erwin, CA, 20 to 24 August 1990; and Ft. Polk, LA, 11 to 14 September 1990.

Information about any changes will be available through the division adjutant general or G1. Each post will establish local procedures and limitations on interview requests. The career managers will provide current officer record briefs and official military personnel file microfiche for those interviewed.

All officers should plan to attend the OPMD update and warrant officer briefings. If officers meet the local criteria, they should request an interview and ensure they have submitted a current officer preference statement 30 days before the trip date scheduled for their post.



Reconfiguration of Reserve Component Aviation Officer Advanced Course (RC-AVOAC)

The Reserve Component Aviation Officer Advanced Course (RC-AVOAC) has been changed (see figure). The Phase 3 Active Duty Training (ADT) for fiscal year (FY) 1990 has been eliminated. The tasks taught in Phase 3 have been incorporated in the FY 1990 Phase 2 company commander module (CCM) and Phase 1b Aviation-Specific Army Correspondence Course Program (ACCP). Incorporation of these tasks enhances the overall concept of the CCM. Consequently, this change places more thorough, intensive and doctrinally sound tactical and technical training into one ADT phase. This change also increases the CCM programed hours from 84 to the 100 maximum allowable hours. In addition to this, Phase 1b ACCP has been increased to 20 ACCPs with a total 104 hours.

This change affects all officers presently enrolled in the RC-AVOAC. Those who have completed the CCM and 2b Aviation-Specific Phase will automatically receive an additional 13 ACCPs. These added ACCPs will give them instruction material previously programed for the Phase 3 ADT instruction. Graduation certificates are awarded to officers who complete these ACCPs and Phase 2a.

Those presently or previously enrolled in the 2b Aviation-Specific Phase will automatically receive 13 more ACCPs to complete. Future enrollment of the Branch Specific ACCP Phase will total 20 ACCPs. Phase 2a, Common Core (inactive duty training/ACCP) remains unchanged except for the renumbering from Phase 2a to Phase 1a.

These changes also affect the "old" four-phased RC-AVOAC (FY 1988). Phase 3 ACCP (FY 1988) equals Phase 2b and the additional 13 ACCPs required for those presently or previously enrolled in 2b. Therefore, when an officer completes the two correspondence phases of the four-phased RC-AVOAC, the only course necessary for completion is Phase 2 ADT (FY 1990).

Diplomas are awarded after an officer completes the two correspondence phases of the four-phased RC-AVOAC (FY 1988) and the CCM Phase 1 ADT. To receive diplomas, or more information, officers should mail their completion certificates to Commander, U.S. Army Aviation Center, ATTN: ATZQ-CAT-0, Ft. Rucker, AL 36362-5000, or phone 205-255-4750, AUTOVON 558-4750.

AVIATION LOGISTICS
U.S. Army Aviation Logistics School

USAALS

A BRIEF HISTORY

Ms. Jean Cerve
Directorate of Training and Doctrine
U.S. Army Aviation Logistics School
Ft. Eustis, VA

THE U.S. ARMY Aviation Logistics School (USAALS), Ft. Eustis, VA, will be 7 years old 1 October 1990. This most recently established of the Training and Doctrine Command (TRADOC) service schools has accomplished much in its brief existence.

The history of USAALS is part of the Army's long effort to consolidate all aviation-related functions. USAALS' roots go back to World War II and an enlisted field artillery air mechanics course at Ft. Sill, OK. After the war, the U.S. Air Force trained Army mechanics in fixed- and rotary-wing aircraft maintenance—first at Sheppard Air Force Base, TX, then at Gary Air Force Base, TX. A 19-week Army helicopter mechanic's course at the Field Artillery School, Ft. Sill, supplemented the Air Force training.

The problems inherent in sharing logistics responsibilities with the Air Force surfaced during the Korean War. The Air Force procured aircraft and handled maintenance and supply at depot level; the Army determined requirements and handled maintenance and supply at organizational and field levels.

In 1952, the Transportation Corps succeeded the Ordnance Corps as proponent for aviation logistics support. By 1953, the newly established Army Aviation School at Ft. Sill was teaching flight and aviation maintenance courses. The Air Force, however, continued to teach the primary fixed-wing flight course with helicopter and fixed-wing maintenance. Again, the Air Force-Army division of responsibility caused problems with coordination and control.

It wasn't until 1954 that the Department of the Army recommended consolidation of all Army Aviation maintenance instruction at the Transportation School (USATSCH), Ft. Eustis. USATSCH assumed responsibility for aviation field maintenance training and the Aviation School, Camp Rucker, AL, for aviation organizational maintenance training. USATSCH retained responsibility for aviation logistics support until 1983 when that function was transferred to the newly formed Aviation Logistics School.

A significant milestone for the future development of USAALS occurred in April 1983 when the Aviation Branch was established as a member of the combat arms team. That event ended the practice of assigning Army aviators to several different branches. The event also strengthened the trend toward consolidation of all aviation-related training under the U.S. Army Aviation Center (USAAVNC) and the Aviation Branch Chief, Ft. Rucker.

However, aviation logistics remained in the words of the former branch chief, then Major General Ellis D. Parker, "unnaturally separated" from aviation operations until 1 October 1988 when the Aviation Center became proponent for USAALS.

Recommendations and plans were already being made for gradual consolidation of the entire aviation mission—including logistics—when the Army Aviation Branch was created. In fact, a part of the Aviation Branch Implementation Plan called for establishing an aviation logistics school at Ft. Eustis. Ft. Eustis was the logical location for such a school, because USATSCH had been carrying out the aviation logistics mission there since the 1950s. Continuing to perform the aviation mission at this same location would conserve resources.

At the same time, it was felt that consolidation under the Aviation Center would have many advantages: cost effectiveness, standardization, more effective training, logical and consistent development of doctrine and better responsiveness to defense needs. However, the memorandum of agreement signed in October 1983 by the commander, Aviation Center, and the commandant, Aviation Logistics School, gave command and control of USAALS to the commander, U.S. Army Transportation Center and Ft. Eustis (USATCFE). This arrangement continued until 1988.

USAALS Under USAAVNC Control

A TRADOC study, begun in May 1987, determined the changes necessary to bring USAALS under USAAVNC control. However, the study was not approved by Department of the Army, because factors outside TRADOC needed consideration. In December 1987, the Vice Chief of Staff of the Army directed a special study group to write an implementation plan. TRADOC later approved the study group's recommendation to transfer command and control of USAALS to the commander, USAAVNC, on 1 October 1988.

USAALS was originally joined to its parent (transportation) school in a kind of "separate but equal" status under a single commandant. This individual was also commander of USATCFE. The first commandant of the U.S. Army Transportation and Aviation Logistics Schools was Major General Aaron L. Lilley. MG Lilley was TRADOC proponent for transportation, and he exercised responsibilities for the aviation proponent as prescribed by the memorandum of agreement in October 1988. The two schools shared a school secretary with responsibilities for administration, maintenance, facilities and supply. They also shared facilities and resources at Ft. Eustis that enabled the new Aviation Logistics School to come into being without additional resources.

Serving under the commandant was an assistant commandant, Colonel Albert B. Luster, who managed the two schools. A deputy assistant commandant for aviation logistics, Colonel Patty E. Brown, was the principal head of the new school. Three directorates, three training departments, a proponency office and a program management office made up the original organization.

According to the memorandum of agreement signed by MG Bobby J. Maddox, then commander of the Aviation Center, and MG Lilley, effective 14 October 1983—

- Aviation logistics matters would be coordinated with the Aviation Center before forwarding to the Logistics Center, the Combined Arms Center or Headquarters TRADOC.
- The Logistics Center commander had tasking authority to USAALS for aviation logistics matters; USAALS, in turn, would coordinate these taskings with the Aviation Center.
- USAALS would exercise responsibilities for aviation logistics matters for the aviation proponent.
- USAALS' inception coincided with the implementation of TRADOC School Model 83 (October 1983). This was an added administrative burden on the harried personnel setting up the new school. Nevertheless, the school was born without any interruption of mission and was organized according to School Model 83. A few approved deviations were designed to save resources, such as sharing the school brigade and school secretary with USATSCH.

USAALS' original mission was threefold: support the Aviation Branch and School, ensure integration of aviation logistics into the overall Army logistics program and conserve resources. The school was able to conserve resources by economizing housekeeping and support functions at Ft. Eustis. The school also used the expertise of staff and faculty. The staff and faculty had previously written and taught aviation logistics when the school was still part of USATSCH.

In July 1987, USAALS received its new school crest with the motto "Support and Sustain" on the scroll. On 22 October 1987, the school was incorporated into the Aviation Regimental System when the 1st Battalion, 8th Transportation Brigade, was redesignated the 1st Battalion, 222d Aviation Regiment. Also in 1987, the school successfully participated in a self-study of its courses, programs, resources, personnel and facilities. This study resulted in its accreditation by the Southern Association of Colleges and Schools.

Important events for USAALS occurred in 1988. The Aviation Center became proponent for aviation logistics and assumed command and control of USAALS. USAALS became a nonsupporting tenant activity at Ft. Eustis. This ended a long evolutionary process involving many studies and plans.

Under the memorandum of agreement signed in September 1988 by then MG Parker, commander of USAAVNC, and MG Samuel N. Wakefield, commander of USATCFE—

- USAAVNC commander would report to both the Logistics Center and the Combined Arms Center commanders.
- The Logistics Center commander had tasking authority over USAALS for aviation logistics matters.
- USAALS would share existing facilities at Ft. Eustis with USATSCH.
- Transportation Center and Ft. Eustis commander would provide base operations support to USAALS.
- Realignment would be implemented within existing resources.

The school's mission remained unchanged after the realignment with Ft. Rucker. Colonel Thomas M. Walker remained USAALS assistant commandant. He became directly responsible to the Aviation Center commander and acts as his primary assistant for management of the school's directorates and training departments.

Staff at the Ft. Eustis newspaper, *The Wheel*, dated 29 December 1988, had interviewed the school's deputy assistant commandant, Mr. Rod Schulz. He said the school's alignment with Ft. Rucker "...closes the loop and marks the beginning of the total integration of Army Aviation missions." The realignment did not cause any major effect on Ft. Eustis. Neither did the realignment change USAALS' relationship to the Logistics Center.

The main effect on the 8th Transportation Brigade was that aviation soldiers began wearing the Aviation Center patch. This latest change in the school's status benefited the Army's AirLand Battle mission because this change unifies aviation under one chief. This alignment will cause the combat and logistical support functions to pull closer together and provide aviation support to the Army's combat mission.

New Training

The school began to conduct the new 66-series technical inspector courses and expanded 10-level advanced individual training (AIT) courses. Initial efforts for this training were hampered by a shortage of facilities, training devices, aircraft and major components. To compensate, the school went to a three-shift operation and sought equipment from all available resources. The equipment included crash-damaged aircraft and components awaiting rebuild at depot level.

Other new instruction coming on line in the school's early years included the aviation life support equipment course and AH-64 Apache and OH-58D Kiowa Army Helicopter Improvement Program (AHIP) training. The new Advanced Noncommissioned Officer Course Common Core, developed by the Sergeants Major Academy, began in October 1984. The school conducted the only nondestructive inspection training in the Army. All courses were group paced. With TRADOC approval, USAALS converted all training, doctrinal and organizational products from transportation 55-series numbering to aviation 1-series numbering.

In 1985, the school moved into the final year of the 2-year implementation phase of revised career management field 67 (Enlisted Aircraft Maintenance and Professional Development). That year also marked the end of employing military occupational specialty (MOS)-68 personnel for allied shop technical inspector duties. The new 66-series technical inspector became responsible for inspecting entire aircraft, including component repair.

One of the most exciting programs at Ft. Eustis was AH-64 Apache attack helicopter training. The first of 14 AH-64s appeared at Ft. Eustis in late January 1985. A new 55,000-square foot training facility for the helicopter was completed in early 1985. This facility housed the 76 training devices and other equipment to train the nearly 900 maintenance personnel needed each year to meet field requirements.

During 1985, the contractor-developed training program arrived. Maintenance instruction and key personnel training began in March. The resident training AH-64 Apache Helicopter Repairer Course and AH-64 Advanced Attack Helicopter Crew Chief/Mechanic Course began in July. Training equipment for the Apache was extensive. In addition to actual aircraft, this equipment included four specially designed training devices and many panel devices for demonstration and individual student use.

In January 1986, USAALS organized a new training department, the Department of Advanced Helicopter Training, to train enlisted soldiers on the AH-64 and OH-58 AHIP. Instead of being organized along MOS lines, the new department

combined both MOS 67- and 68-series training under a single organization. This organization included two divisions, one for AH-64 and one for OH-58D training. Combining all specific aircraft instruction under a single division meant sharing training aids, devices, aircraft and also saving costs.

In 1987, USAALS participated in development of a new type of training device, the classroom system trainer (CST). This device allows each student to proceed at an individual pace. The CST incorporates the interactive videodisc (IVD) training process that was currently being evaluated at the school. The school also developed a plan to reduce inventory for maintenance training by replacing aircraft with training devices. These included—

- Conversion of seven AH-1G Cobra, Category C, aircraft to AH-1F armament and electrical training devices.
- Conversion of two CH-47C Chinook maintenance trainers to CH-47D configuration.

These measures were aimed at returning flyable aircraft to the active inventory; reducing per-student training costs; and increasing actual hands-on training and student-to-equipment ratios. In 1988, the school provided horizontal integration of leadership training and field training exercises for advanced and basic NCO and AIT students. This training reinforced leadership skills by permitting students to organize and operate aviation units in a field environment without guidance from commissioned officers.

Combat development projects for the new school included the transportable helicopter enclosure (a portable maintenance shelter); a self-propelled maintenance crane; a new ground power unit; unit productivity studies; and battle damage repair systems. Certain aviation logistics projects that were ongoing at USATSCH were continued by USAALS: the self-propelled crane, aircraft maintenance and positioning and the new aircraft tool system. Among other developmental projects were the rapid aircraft recovery kit; the self-propelled elevating maintenance stand; AH-64A automatic test equipment; and a helicopter internal cargo-handling system.

Aircraft Productivity

A major combat development goal for USAALS was to increase aircraft productivity by increased mission ability. A number of projects designed to further this objective were ongoing, including—

- Aircraft combat maintenance/battle damage repair (ACM/BDR).
- Progressive phased maintenance.
- Predictive aircraft maintenance system.
- Aviation direct current generator system.
- Aviation decontamination, de-ice and cleaning system.
- Electronic equipment test facility.
- Nondestructive test equipment.
- Tactical aircraft maintenance platform.

During 1986, the light helicopter experimental (LHX) program increased in momentum. The LHX would enhance battlefield maneuverability and firepower with a greatly improved new generation of helicopters. USAALS worked with the Aviation School and the LHX project manager to develop a maintenance concept. This concept would influence the design and take advantage of technological advances.

One of the design goals was a streamlined two-level maintenance system that would incorporate user and depot maintenance tasks only. The school initiated a study of two-level maintenance for the LHX. This type of maintenance was expected to reduce the number of mechanics and consolidate skills into new specialties.

A top-priority project was aircraft combat maintenance and battle damage repair. ACM/BDR was designed to rapidly return crippled aircraft to safe flyable status without lengthy repairs. The goal was to provide common methods, tools and repair kits. These were to replace the numerous individual, spur-of-the-moment techniques that had been employed in Vietnam during emergencies. ACM/BDR would standardize these procedures and give soldiers preconflict experience with them. USAALS, together with the Aviation Applied Technology Directorate, developed an electrical kit, the first in a series of ACM/BDR kits.

Other kits to follow include structural repair, hydraulic repair and fuel cell repair. These kits are being developed under the new program name called battlefield damage assessment and repair.

In its role as developer of aviation logistics doctrine and materiel, USAALS engaged in many activities designed to foster developments of aviation logistics:

- USAALS and USAAVNC cohosted the Aviation Logistics Conference at Ft. Rucker in August

1984. The conference was the first time aviation field commanders, nonrated commanders and logisticians met in a general officer forum to discuss aviation logistics exclusively.

• USAALS participated with the Logistics Center and USATSCH in PROLOG 85. PROLOG 85 was the Army's second annual demonstration of state-of-the-art logistics developments held 13 to 17 May 1985 at Ft. Eustis. To plan and carry out maintenance more efficiently and to help overburdened, undermanned maintenance units, USAALS displayed two proposed concepts: predictive aircraft maintenance and progressive phased maintenance. The former provides a prognostic capability and automates aircraft maintenance data input from user level to depot and system command level. The latter is a new scheduled-maintenance system to be evaluated. The objective of both systems was to repair more with fewer repairers.

• The Maintenance Test Flight Division of the Directorate of Evaluation and Standardization conducted a worldwide maintenance test flight evaluator training seminar in December 1988 at Williamsburg, VA. The seminar focused on technical aircraft systems training; updated current regulations and policies. The seminar also included a training workshop for maintenance test flight evaluators.

• The commandant holds an annual aviation logistics and maintenance commanders conference at USAALS. The conference provides emerging-trend updates and a forum for commanders to develop resolutions to issues collectively.

This year, USAALS is facing a future of budget constraints and personnel reductions. On the other hand, the school is facing increasing demands on logistics because of emerging technologies. Artificial intelligence, automated systems, lightweight composite materials, high-speed integrated circuitry and expanded IVD technology will impact on the school's mission. As USAALS prepares for this future, it is greatly strengthened and unified by the transfer of proponency of aviation logistics to the Aviation Branch Chief.

U.S. Army Class A Aviation Flight Mishaps

	Number	Flying Hours	Rate	Army Fatalities	Total Cost (in millions)
FY 89 (through 31 May)	18	1,050,384	1.71	11	55.1
FY 90 (through 31 May)	20	1,061,735*	1.88	23	90.6

*estimated

Flight Safety Parts Program Update

U.S. ARMY Aviation has surpassed its goal in risk reduction through life cycle safety management. The goal is a 5-percent reduction annually in the number of major Class A to C accidents from fiscal year (FY) 1985 through FY 1990. To date, U.S. Army Aviation has maintained an average 6-percent reduction in major Class A to C accidents (figure 1, page 48). The reduction is more significant when considering it was achieved during the advent of new mission scenario requirements for Army pilots. Some of those requirements include night vision devices, nap-of-the-earth and drug abatement flying.

The reduction in the number of Class A to C accidents was achieved, in part, through implementation of the Flight Safety Parts (FSP) Program. General Maxwell R. Thurman, former Army Vice Chief of Staff, initiated this program (see "Flight

Mr. Timothy C. Rickmeyer
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Safety Parts Program," February 1986 *Aviation Digest*). The FSP Program has become a driving force behind Army Aviation life cycle safety. This program is a joint Army and industry effort to provide life cycle management of aircraft parts whose integrity is vital to flight safety. All aircraft used by the Army are included in the program. Defining, monitoring and controlling FSP from the manufacturing stage throughout life cycle to retirement form the basis of the program. The U.S. Army Aviation Systems Command (AVSCOM), St. Louis, MO, continues to emphasize the flight safety program.

Background

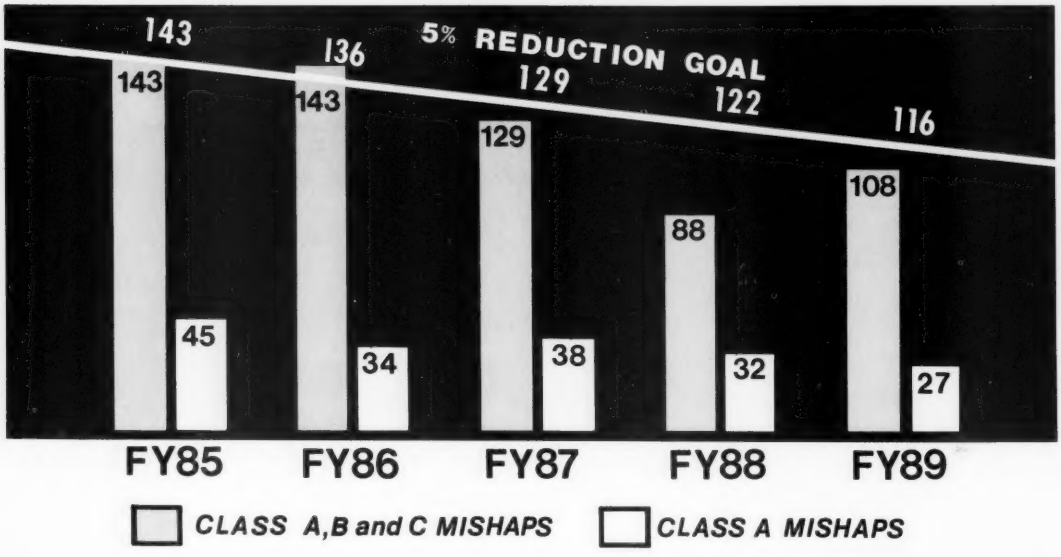
The structure of today's Army life cycle safety management began with the institution of the Critical Parts Program in the early 1970s. Aircraft parts in this program were chosen for their essentiality to flight safety, identified as critical parts and controlled to highly detailed standards. The standards included such features of a part as dimensions, finish, material, process, inspection, etc., which were paramount to part reliability. In 1965, however, three major Army helicopter mishaps, attributed to materiel causes, led the Army to reevaluate and restructure the Critical Parts Program. An investigation revealed three significant deficiencies with the program that limited its scope as follows:

- The program was only applicable for newer aircraft where production contracts were initiated within a specific timeframe.
- Procedures ensured the integrity of the part only during the manufacturing cycle.
- No formal means existed to provide feedback information of problems or to require regular reevaluation of the part selection and control procedures.

These deficiencies noted, the FSP program was developed to promote more stringent requirements on all critical parts during manufacture, testing, transporting, operation, maintenance, overhaul/repair and procurement. To satisfy these requirements, the Army now mandates the following:

- Maintain a collective source, AVSCOM, for formal reporting documents to analyze trend information obtained from testing and normal operations on all aircraft; i.e., quality deficiency reports, equipment improvement reports, test incident reports, maintenance action reports, etc.
- Identify FSP and critical characteristics in manufacturer's drawings, field or depot manuals.
- Reevaluate FSP on a recurring basis.

FIGURE 1: Reduction in the number of major Class A to C accidents.



ENGINEERING PROGRAM	NUMBER OF COMPONENTS ORIGINALLY IDENTIFIED	CURRENT NUMBER OF COMPONENTS CURRENTLY IDENTIFIED	TOTAL NUMBER OF COMPONENTS THAT HAVE COMPLETED OR ARE UNDERGOING TESTING
AH-1	80	317	75
OH-58A/C	127	257	51
OH-58D	Not initially identified	104	13
AH-64	104	245	41
OV-1D/RV-1D	7 assemblies	7 assemblies	7 assemblies
UH-1	90	398	77
CH-47D	303	447	51
CH-54	222	222	0
UH-60	182	430	94
Engines	Individual engine parts not initially identified	110 on T700-GE-700	Phase I complete
		91 on T700-GE-701	Mission Testing FY 90
		161 on T63-A-700 167 on T63-A-720	Test Preparation Ongoing
		166 on T703-AD-700	Testing Begins FY 90
		88 on T55-L-712	Turbine Wheel Tests FY 90
		129 on T53-L-13/703	Component Testing Ongoing

FIGURE 2: Flight safety parts surveillance.

In addition, the Army uses the U.S. Army Aviation Development Test Activity, Ft. Rucker, AL, to monitor and provide analyses of maintenance and operation procedures, coupled with part wear or failure information of FSP faults for *lead the fleet* aircraft. These aircraft are test aircraft that are flown at a rate that exceeds field rates according to a profile agreed upon by the sponsor.

Status

AVSCOM's FSP Program efforts continue to be engaged heavily in identifying and testing additional FSP on both past and recently procured aircraft. Consequently, the U.S. Army has updated its original FSP identification and testing list to reflect the increases shown in figure 2.

In response to the expanded number of FSP, aircraft manufacturers in private industry are cooperating with U.S. Army requests to test greater numbers of FSP by building larger test facilities and increased quantities of test fixtures. Figure 3 shows a typical flight safety parts fatigue test

FIGURE 3: Flight safety parts fatigue test laboratory.

laboratory. Typical test fixtures for surveillance testing are designed to fatigue test FSP. The *crucial* determinants sought in these tests are FSP performance and life verification. In figure 4, the main rotor rotating control assembly of an AH-64 Apache is undergoing fatigue life verifications in a test fixture. The unexpected performance of an Apache's tail rotor's rotating control is being proven in fatigue testing in figure 5.

Significant results observed in recent FSP surveillance tests include detection of parts that exceed corrosion or damage limits such as the main driveshaft and main rotor hub assembly on the AH-1S Cobra (figure 6). In surveillance testing, cracked spline roots were discovered on the forward rotor head of the CH-47D Chinook, new crack origins in the main rotor blade cuff of the UH-60 Black Hawk and crack propagation patterns on the metal main rotor blade of the UH-1 Huey. In addition, fatigue lives of aircraft components such as the OV-1D Mohawk wing/fuselage center section and the main rotor shaft of the UH-60 are now undergoing life validation testing (figure 7). Validation of inspection intervals for the main rotor bearing on the Apache also were achieved. Full life capability tests were demonstrated on components and/or full assemblies of the T700-GE-700, -701 and T53-L-13B aircraft engines.

Actions taken to enhance safety as a consequence of FSP surveillance findings include revision of maintenance requirements, adopting new monitoring programs, introduction of alternate material treatment techniques and incorporation of new assemblies. For instance, repair methods for the wing/fuselage center section of the OV-1D have been developed. To increase the level of safety monitoring in the UH-1, a recurrent blade inspection program has been initiated. Adapting shot peening instructions in the UH-60 main rotor control horn overhaul procedures is an example of an alternate material treatment recently introduced. Also, the OH-58D Kiowa has incorporated a bellows snubber in the fuel control assembly to reduce the risk of bellows rupture.

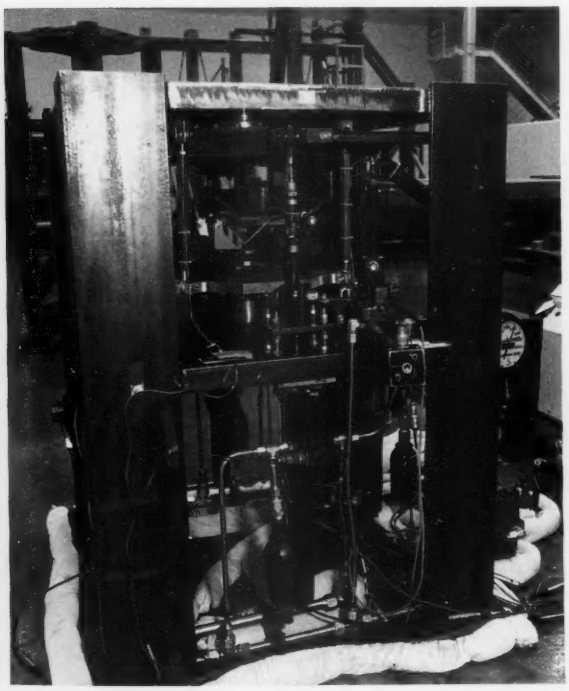
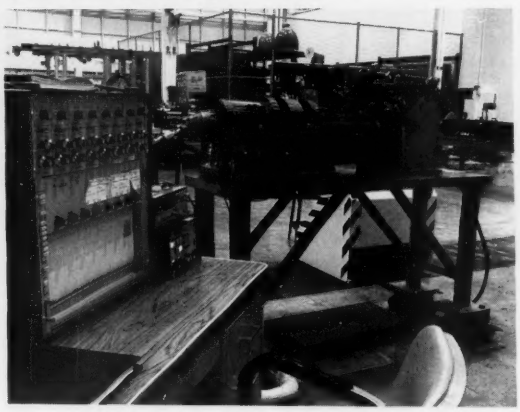


FIGURE 4 (left): AH-64 Apache main rotor rotating control assembly.

FIGURE 5: Unexpected performance of an Apache's tail rotor's rotating control being proven in fatigue testing.



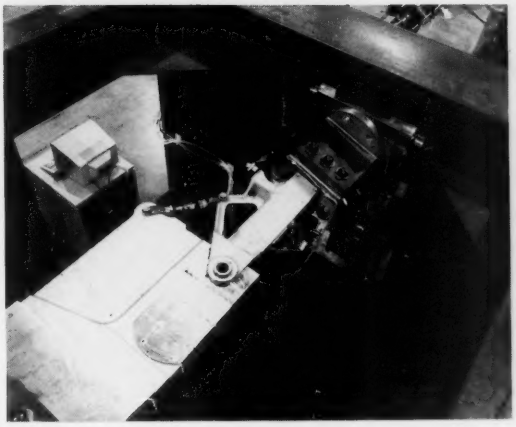


FIGURE 6: Flight safety parts surveillance tests to detect, among other things, parts corrosion on the AH-1S Cobra.

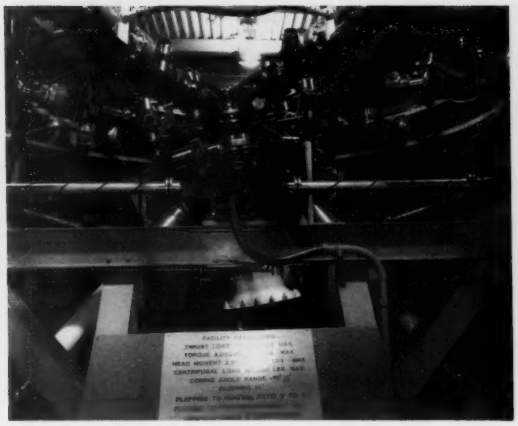


FIGURE 7: Fatigue life of aircraft components undergoing life validation testing.

After AVSCOM decides to initiate safety procedures because of findings in surveillance testing, several difficulties persist in informing field activities of newly identified FSP and recently adopted maintenance procedures. Field/depots initially receive updated information on new FSP and their related maintenance requirements through maintenance information messages (MIMs). The FSP information also is provided for technical manuals and depot maintenance work requirements publications to alert the field/depots of an identified FSP and its inherent maintenance requirements. Note, however, the fact that field/depots do not receive graphic illustrations in MIMs; revised publications are not issued for at least 1 year after initial identification of an FSP. Publication revision delays are caused by renegotiating contract changes with publications contractors, printing and issuing of updated manuals. Until an adequate practice can be found to meet the challenge of communicating FSP information, AVSCOM is using a variety of alternate methods to immediately inform the field/depots of identified FSP and their maintenance procedures by distributing illustrative pictures and videos, and holding informative briefings.

Summary

To maximize the benefits of the FSP Program, AVSCOM must persist in meeting its challenges. The most difficult challenges remain in identification/verification of FSP and their critical characteristics. This was evident in 1987 and 1988 when several procuring activities improperly obtained FSP through local purchase, resulting in AVSCOM issuing safety of flight messages. FSP that are locally purchased have not been verified for adherence to critical characteristics. FSP must continue to be procured through the AVSCOM supply system to maintain 100-percent identification/verification or face severe safety and readiness degradation in U.S. Army Aviation. Additional program challenges include total fleet participation in surveillance and feedback. If maintained, report of monitoring results and part failures will culminate in valuable lessons learned for present and future airworthiness of aircraft systems.

In conclusion, U.S. Army Aviation life cycle management has made great strides in safety under the control of the Flight Safety Parts Program. Full participation and cooperation in the control of critical aircraft parts must continue to be maintained to prevent oversights and eventual aircraft mishaps. Plus, knowledge gained in FSP monitoring/testing, if properly documented and distributed, gives Army Aviation a better insight on how aircraft systems survive in the real world environment. This knowledge also provides understanding in advance of how aircraft materials and designs will fare in future aircraft.

The Army Aviation National Maintenance Point

A historical brief about the Directorate for Maintenance at the U.S. Army Aviation Systems Command

Colonel Gary D. Johnson
Director of Maintenance
U.S. Army Aviation Systems Command
St. Louis, MO

MAINTENANCE IS MANY things to many people. Understandably, many people think that maintenance means to fix or repair something after it breaks! Other definitions of maintenance include the act of maintaining or state of being maintained; the work of keeping something in suitable condition; and a means of maintaining or supporting. The latter definition is most appropriate for the mission of the Army Aviation National Maintenance Point (NMP).

To get the job done, the NMP employs both career military and civilian personnel. They possess the experience and skills necessary to function successfully in diverse areas of interest such as maintenance engineering; depot maintenance overhaul/repair; new equipment training; parts and equipment provisioning; maintenance management; depot engineering; and maintenance technical publications.

Beginning of Army Aircraft Maintenance

The true beginning of the history of maintenance of Army aircraft goes back to that very first aircraft used by the Army—discounting when the U.S. Air Force was the former Army Air Corps and predating the birth of the present Directorate for Maintenance.

In retrospect, Army elements and people have had a major influence in shaping and forging maintenance into what it is today. Most of these earlier pioneers, such as the Field Artillery, Ordnance Corps and Transportation Corps, are no longer directly involved with aviation maintenance. Today, the NMP is an element of the U.S. Army Aviation Systems Command, better known as AVSCOM, located in St. Louis, MO.

AVSCOM. The present AVSCOM has grown constantly in prominence and importance to the Army and the Army Aviation Program. AVSCOM began in St. Louis 19 January 1953 as the Transportation Corps Army Aviation Field Office with 5 officers and 48 civilians. The effect of time and organization resulted in the designation on 11 March 1983 of the present AVSCOM.

Today, AVSCOM has a twofold job: one part, readiness, focusing on today's events and problems; the other part, research and development,

focusing on tomorrow. As a measure of its magnitude, AVSCOM is responsible for providing life-cycle management. This management includes maintenance of all Army aircraft and related systems with complete logistics, technical and administrative support. AVSCOM embodies up to 9,000 Army aircraft and another 2,500 operated by non-Army customers.

NMP. The NMP, which began in 1953, is made up of a director's office and six major divisional elements. The mission of the NMP is not a modest "fix-it" statement, but is a comprehensive assembly of words covering a broad range of highly technical and professional objectives. The NMP—

- Manages and directs these functions: maintenance management; maintenance engineering; support planning; overhaul control; technical publications; and technical assistance for assigned materiel throughout its life cycle.
- Accomplishes depot support and reliability centered maintenance (RCM) engineering throughout the materiel life cycle.
- Serves as AVSCOM's repository of maintenance expertise; acts as technical focal point for the RCM airframe condition evaluation; and monitors aircraft analytical corrosion evaluation programs.
- Monitors and ensures the adequacy of command activities performed in support of the NMP mission.
- Manages and supports assigned automated test equipment systems and test program sets.

Obviously, these tasks involve many skilled people, such as engineers, technical writers, publication specialists, computer specialists, maintenance technicians and maintenance managers. The underlying and never-ending challenge to the NMP is to find and perfect new techniques and tools to do a maintenance task faster, easier, more economically and longer. At the same time, NMP constantly recognizes rapidly advancing technology and more complex aircraft of the future.

The following list shows some of the major NMP accomplishments in the last three decades:

1961 to 1975

The Vietnam Era. This period was a monumental challenge to every facet of logistics support, including maintenance. A number of new support concepts were developed and used during this critical time. Some of these concepts have had a major influence on how we do business today. Three notable events that have had a lasting impact on aviation maintenance are—

- *Floating aircraft maintenance facility (FAMF).* This was an aircraft maintenance facility installed on a ship. The FAMF was stationed in the Vietnam area and provided a variety of aircraft maintenance services to land based forces. The FAMF was eventually dismantled and the ship decommissioned.
- *Contract field teams (CFT).* To augment in-country maintenance capabilities in Vietnam, soldiers used CFTs extensively. Use of CFTs continues today to augment the Army's aircraft maintenance capability and to modify aircraft in the field.
- *On-condition maintenance.* This was a system to determine and select those aircraft needing depot maintenance. A periodic physical check revealed the condition of the aircraft. Today, this basic concept continues, although refined, under the name of aircraft condition evaluation or ACE.

1977

Three Level Maintenance. Aircraft maintenance is realigned to a three-level support concept—aviation unit maintenance/aviation intermediate maintenance (AVIM)/depot. This resulted in changes to tables of organization and equipment, maintenance manuals, shop and tool sets and increased personnel training.

New Tool/Shop Concept. Shop sets currently used are designed to support a number of aircraft types. These sets result in costly duplication, delays for assembling sets and incompatibility with the three-level maintenance concept. AVIM and depot-level shop sets were developed, tested, classified and fielded for evaluation.

Modular Engine Test System (METS)-T700-GE-700 Engine. A prototype T-700 engine adapter kit was developed, assembled and verified. When a design specification is developed from the valid configuration, the remaining five METS in the field will be modified by December 1990.

1978

Engine Service Center (ESC) Quick Reaction Teams. The ability was established at the Corpus Christi Army Depot (CCAD), Corpus Christi, TX, to respond to depot level assistance requests from the field on engine problems. Requests for assistance either were solved over the phone or an ESC team traveled to perform necessary engine maintenance. Since inception, the ESC program has amassed more than $100 million in cost avoidance by repairing engines in the field that would otherwise have been shipped to CCAD for repair.

1981

AVIM-Divisional Aircraft Maintenance Shop Sets. Fielding of these sets was completed by their issue to 18 Army units worldwide and five National Guard units.

Component Repair Program. Maintenance levels were lowered and parts were made available on selected components formerly repaired at depot level. This change allowed for repair of items at nondivisional maintenance units outside the continental United States (CONUS). This change improved unit readiness and decreased transportation costs by sending fewer of these items back to CONUS depots for repair.

1987

Logbook Automation System (LAS). The LAS, under development for 3 years, was implemented at six field units for further evaluation. Additional fielding of the new system is planned, depending on available funding, computer equipment and personnel. Automation of aircraft logbook records will improve accuracy of the aircraft records and overall unit maintenance management processes.

1989

Component Serial Number Assignment Program (SNAP). The SNAP was implemented throughout Army Aviation. Each individual serial number used to identify any component or assembly must now be assigned or approved by the NMP. SNAP was introduced to prevent serial number duplication and the introduction of "bogus" parts back into the Army inventory.

Technical Publications. A record-breaking 60,000-plus pages for aircraft technical publications were printed. This printing supports every aircraft system in the Army, including ground support and aviation life support equipment. This number includes more than 15,000 pages for the UH-60A Black Hawk helicopter.

Summary

Over the past 30 years, the NMP has been involved in many noteworthy achievements and success stories. None of these were reached in isolation. Every idea and every action leading to a conclusion always involves participation and substantive support. This involvement comes from other AVSCOM elements, field units and other Army commands and offices. This teamwork is fundamental in satisfying a need and the eventual implementation of a solution to a problem or a new concept.

We cannot attempt to tell the entire NMP story. What we can do is give the Army Aviation community a brief overview of the NMP and how it fits into the overall program of Army Aviation.

A Maintenance Tip

A revised issue of DA Pamphlet 738-751, *Functional Users Manual for the Army Maintenance Management System-Aviation (TAMMS-A),* is planned for around October 1990.

One publication change is a new and somewhat simpler DA Form 2410. There will be no separate DA Form 2410 exclusively for the AH-64 Apache helicopter. All TAMMS-A forms will be compatible to manual or computer operation and preparation.

An Open Invitation

We are interested in what readers would like to see in the new NMP "Maintenance Department" articles. We want to tell about things going on, as well as new maintenance ideas and concepts in development. However, our previous writing may not have been about subjects that interest readers.

We encourage readers to drop us an informal note and tell us what they would like to read. If we know what concerns readers, we can do something about it.

I will give our readers my immediate attention. Write to me, Colonel Gary D. Johnson, U.S. Army Aviation Systems Command, ATTN: AMSAV-M, 4300 Goodfellow Blvd., St. Louis, MO 63120-1870.

World Helicopter Championships

1970 to 1989

Mrs. Wille E. Huntley
Writer-Editor

THE IDEA FOR a world helicopter championship was conceived in 1970 during a meeting of the Federation Aeronautique Internationale, Paris, France. The initial plan was to provide for a meeting of helicopter professionals in a setting that would test their skills in precision flying and navigation while promoting comraderie, goodwill and sportsmanship.

The Federation Aeronautique Internationale, a governing body that sanctions all aviation sporting events, conducts the world helicopter championship competitions. In the United States, the Helicopter Club of America, Alexandria, VA, serves as the coordinating body and U.S. liaison with the Federation Aeronautique Internationale.

To date, there have been a total of six world helicopter championships. The United States has participated, in varying degrees, in all six championships.

The First World Helicopter Championship was held in 1971 at Buckeburg, Germany. Although the United States had judges at this event, there were no U.S. aircraft flown in the competition.

In 1973 the Second World Helicopter Championship was held at Middle Wallop, England. An all-female helicopter pilot team from the United States, known as the "Whirly Girls," competed in this championship. Austria, West Germany, the Soviet Union, the United States and England were countries represented. Mr. Mike Meger from the United States won the free-style event. The United States came in fifth in the overall competition.

During the Third World Helicopter Championship held in Vitebsk, Russia, in 1978, the U.S. male team brought home the second place overall winner's trophy. The Soviet Union won first place. Other participants were from Poland, England, Hungary and Czechoslovakia.

The Fourth World Helicopter Championship, the first in which the U.S. Army was given the opportunity to participate, was held in Piotrkow Trybunalski, Poland, in 1981. The U.S. team won first place in the overall competition. Chief Warrant Officer, CW2, George D. Chrest was honored as the "World's Best" pilot. Captain Stephen E. Kee was copilot. The U.S. team consisted of four Army crews and one civilian two-man crew (Mr. John Williams and Mr. Morton Meng), from Bell Helicopter Textron, Inc., Ft. Worth, TX. In addition to the United States competing, Poland, the Soviet Union and Great Britain participated in the championship. (See September 1981, page 22, and January 1982, page 2, *Aviation Digest*.)

Castle Ashley, England, hosted the Fifth World Helicopter Championship in 1986. The U.S. team, made up of all Army crews, defended the title and brought home the trophy as first place winners in the overall competition. CW2 Jon A. Iseminger, pilot; CW3 Jimmy A. Green, copilot; and Staff Sergeant Anthony Gionnantonio, crewchief received the honors for the U.S. team. Poland, the Soviet Union and the United Kingdom were other countries vying for the top winner's honor. (See October 1986, page 2, *Aviation Digest*.)

For the complete story on the Sixth World Helicopter Championship held in Chantilly, France, see "1989 World Helicopter Championship" article on the following page.

Other *Aviation Digest* articles on previous world helicopter championships are:

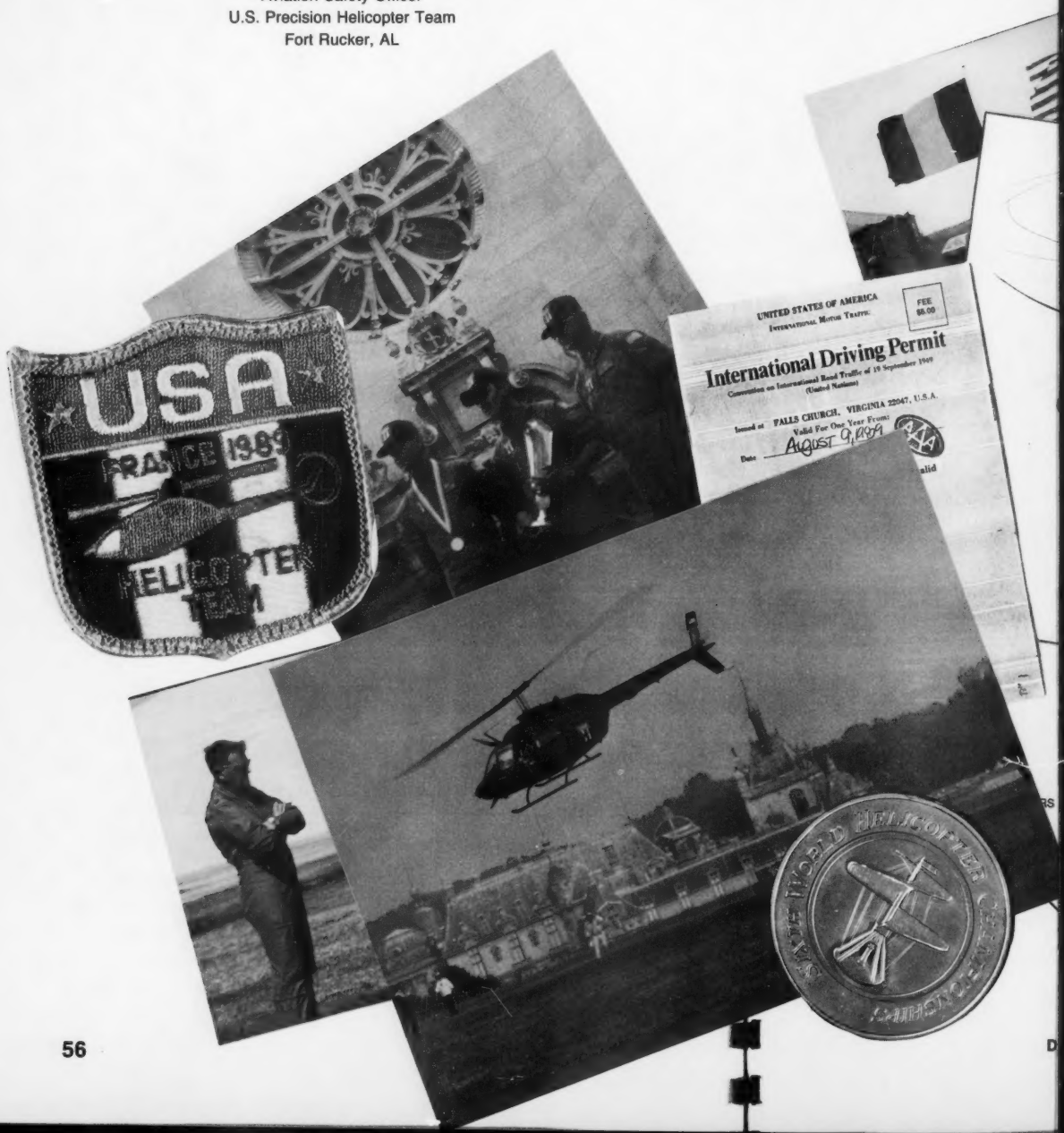
- "U.S. Army Helicopter Team," Reporting Final, April 1981, page 49.
- "World Helicopter Championship," Mr. William Hayes, February 1986, page 18.
- "World Helicopter Champs—Ft. Rucker 1986 Finals," Mr. William Hayes, March 1986, page 30.
- "U.S. Precision Helicopter Team—World Champs," and "U.S. Precision Team—Maintenance Support," Sergeant First Class Ed Rolph, September 1986, pages 8 and 9.

Copies of these articles can be obtained by writing to Editor, *U.S. Army Aviation Digest*, P. O. Box 699, Ft. Rucker, AL 36362-5042 or by calling AUTOVON 558-3178; FTS 533-3178; Commercial 205-255-3178.

Note: The next world helicopter championship competition is scheduled to take place in England in the fall of 1992.

1989 World Helicopter

CW4 E. Daniel Kingsley
Aviation Safety Officer
U.S. Precision Helicopter Team
Fort Rucker, AL



Championship

Illustration by CW2 Steve Snyder

LIEUTENANT Colonel (LTC) Robert E. Harry, commander of the U.S. Precision Helicopter Team (USPHT), turned to the chalkboard and wrote the numbers of the crews chosen to compete for the 1989 World Helicopter Championship (WHC).

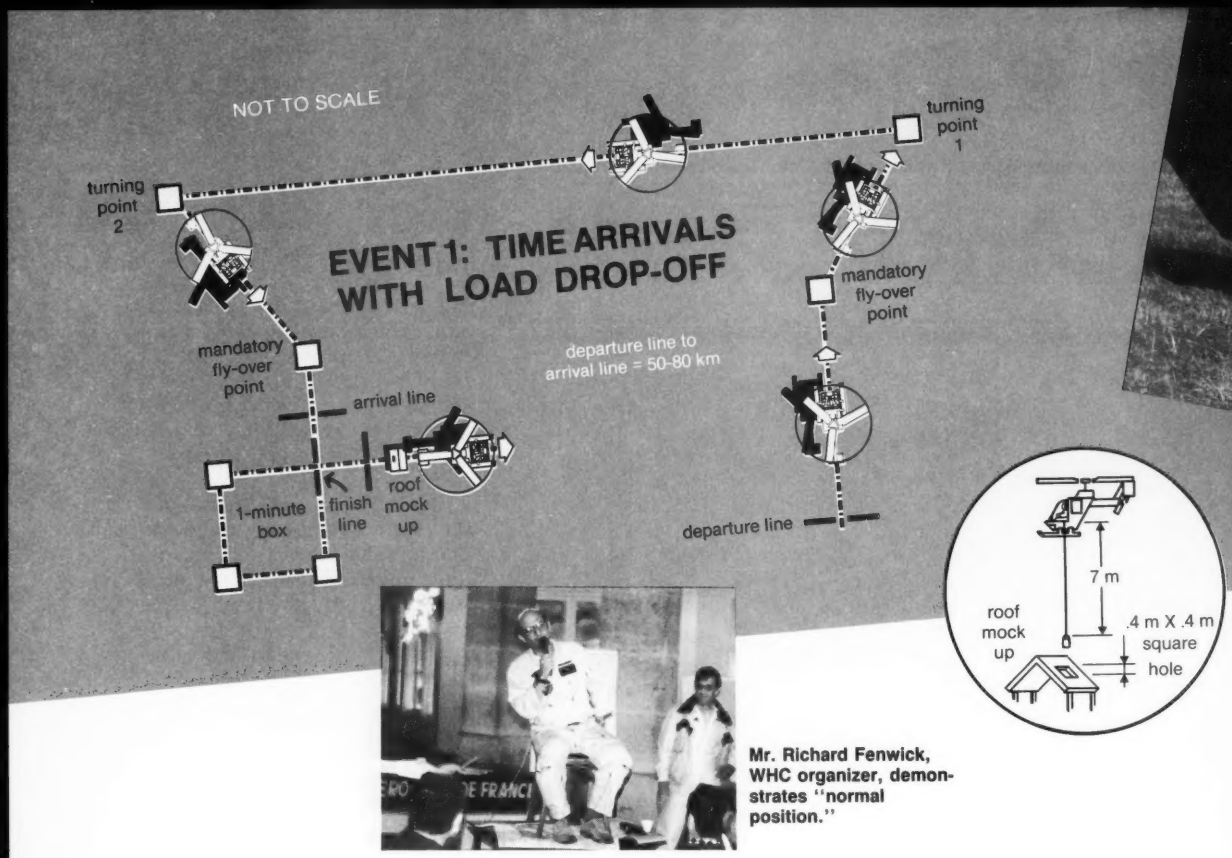
Competitors for the United States: 22 (Loftice/Wright), 33 (Egbert/Hendricks), 55 (Fancher/Rash), 77 (Iseminger/Hobbs), 88 (Jones/Whigham).

Competitors for Individual Honors: 44 (Church/Harbarger), 99 (Stipnieks/Dickens).

Demonstration Team: 11 (White/Collins).

There was a stunned silence at first, and I think the commander had to try to fill it. He spoke briefly concerning the difficulty in the selection task, reminded the crews that all were qualified to be world champions and then started the applause for the crews. This wasn't at all like the 1986 competition when someone clearly fell into the bottom slot, and that crew was a terrific sport about it. There was anguish in the room this time, like a cloud of vapor that choked us all. The preparation was finished; the choices were extremely painful. But the crews were closer, more cohesive than in 1986. And the letdown was staggering. It was over in just a few minutes, but it seemed to take an hour. After the moment of selection was passed, the crews became festive. Toasts were proposed to the crewchief, the staff, the sun, moon and stars. What I feared would be a real dirge turned into a good time.

On Monday, 4 September 1989, LTC Harry briefed answers to questions that WHC organizer, Mr. Richard Fenwick, had been asked. He then warned the crews not to fall in love with their phase IV scores, which were very good. He reminded the crews that



Mr. Richard Fenwick, WHC organizer, demonstrates "normal position."

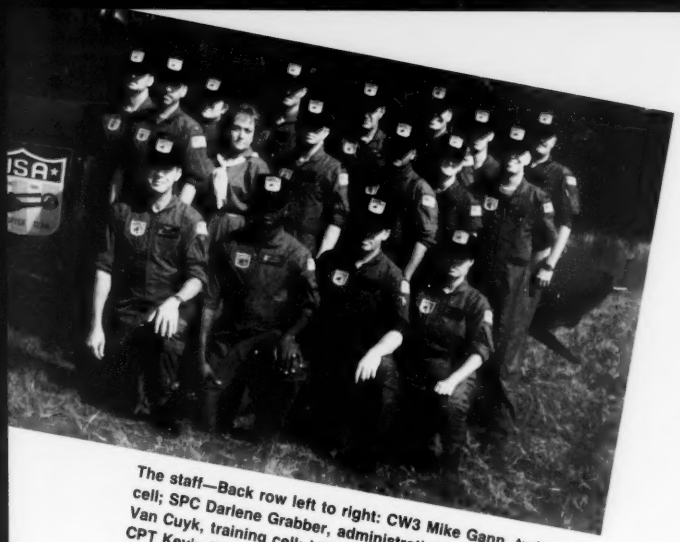
this was their last day to practice rough spots and alternate procedures (such as lost commo in the cockpit).

He gathered the team and judges again around 1300 and lectured them on the focus of this effort. Only one focus—win, win, win. Win was the only purpose, the only effort. There would never be another purpose. He told the judges they must know the rules, carry a copy, have all the answers, be the expert on the site. "Call only what you see. Call only exactly the truth, never mar your integrity. Focus, focus. We want no favors, only uniform and impartial judging." He then addressed the team on a dozen topics ranging from behavior to living arrangements.

On Tuesday, 5 September 1989, I drove 2 hours from Belgium to Chantilly, France, and spent 3 hours trying to negotiate aircraft parking spaces. I had to work them out with Jock, the cosmic French equivalent of the Federal Aviation Administration president and the tower chief at Chantilly. I arrived back in Belgium at 2230.

I was up at 0500 the next day (6 September) and left at 0600 for Chantilly. When the pilots walked from the hotel in downtown Chantilly to the horse racing track where the competition was being held, a French guard (rent-a-cop) wouldn't let them onto the field. They dickered back and fourth in broken English and French until the pilots, all 16 of them, and some staff were standing at a hole in the fence awaiting his permission to enter. Finally, the commander asked the guy if he had a gun. The guard seemed startled when he finally realized what LTC Harry meant and indicated that he didn't carry one. The commander got that mirthful smile on his face, looked back over his shoulder and said, "OK, just follow me..." and marched the pilots past a very frustrated French guard.

The Germans arrived as competitors in civilian helicopters (R22s and an Enstrom). At 1100 the French competitors, all civilians, and having no military aircraft, came over to the tent; they were very friendly. After all the aircraft arrived, the day dragged along. We learned that the Germans were not sponsoring any competition personnel since the Ramstein airshow accident in which two Italian jets collided and crashed into the crowd. Three military pilots arrive, all of whom had been in previous competitions (two from 1986 and one from 1981). We expected them to be the challengers, but there were no German military aircraft. The



The staff—Back row left to right: CW3 Mike Gann, training cell; SPC Darlene Grabber, administrative clerk; CW3 Chris Van Cuyk, training cell; LTC Robert Harry, commander; CPT Dave Dippold, CPT Kevin McGrath, training officer; CPT Dave Dippold, S1; Mr. William Hayes, public affairs officer. Middle row left to right: MAJ Keith Martin, flight surgeon; Ms. Wanda Bellamy, secretary; CPT Herbert Burgess, S3; SPC Otto Fernandez, operations clerk; CPT Robin Lynch, S4; CW4 Dan Kingsley, ASO. Bottom row left to right: MSG Jim Sutton, NCOIC; SSG Ricardo Manuel, supply NCO; CPT John Delaney, executive officer; SSG Connie Sell, S3 NCO. Not pictured: CPT John Allen, maintenance officer.

British competitors, all military, arrived later that day.

The opening exercises were pretty low key. The competitors from all countries formed a line in front of their respective flags; one aircraft representing each nation passed in review. Then the national anthem of each respective nation was partially played. The Federation Aeronautique Internationale officials stood on a stand about 200 meters away in front of the competitors and spoke in French for most of the opening ceremony. Most of the competitors did not understand what was being said. But the ceremony got us started.

The Long Road to the WHC

During the opening exercises, I began to ponder the events since late September 1988. There had been some scuttlebutt about the possibility of having a 1989 USPHT as early as July 1988. Major General (MG) George Putnam (Retired) had written President Ronald Reagan and the Secretary of Defense, and was single handedly responsible for the renewed interest in the American participation in the WHC. We were told we were going to form a team and do it again. LTC Harry was selected again to lead the 1989 USPHT. He called me over to his office, and we put together the first rendition of Letter of Instruction 89-1.

From October through December 1988, the USPHT staff was selected and had to work part-time for the team while in our old jobs, struggling to get into the swing of things. I could see the writing on the wall—this would be a mad house operation.

On 30 December 1988, I met the chosen navigator for the world champion CW3 Iseminger: CW3 Rudolph Hobbs, a sharp night vision goggles instructor pilot from Shell Army Heliport, Ft. Rucker, AL. I learned later that Jon had offered to be the navigator for his 1986 navigator Jimmy Green. Jimmy declined to participate and Jon was offered the chance to defend his title with the navigator of his choice.

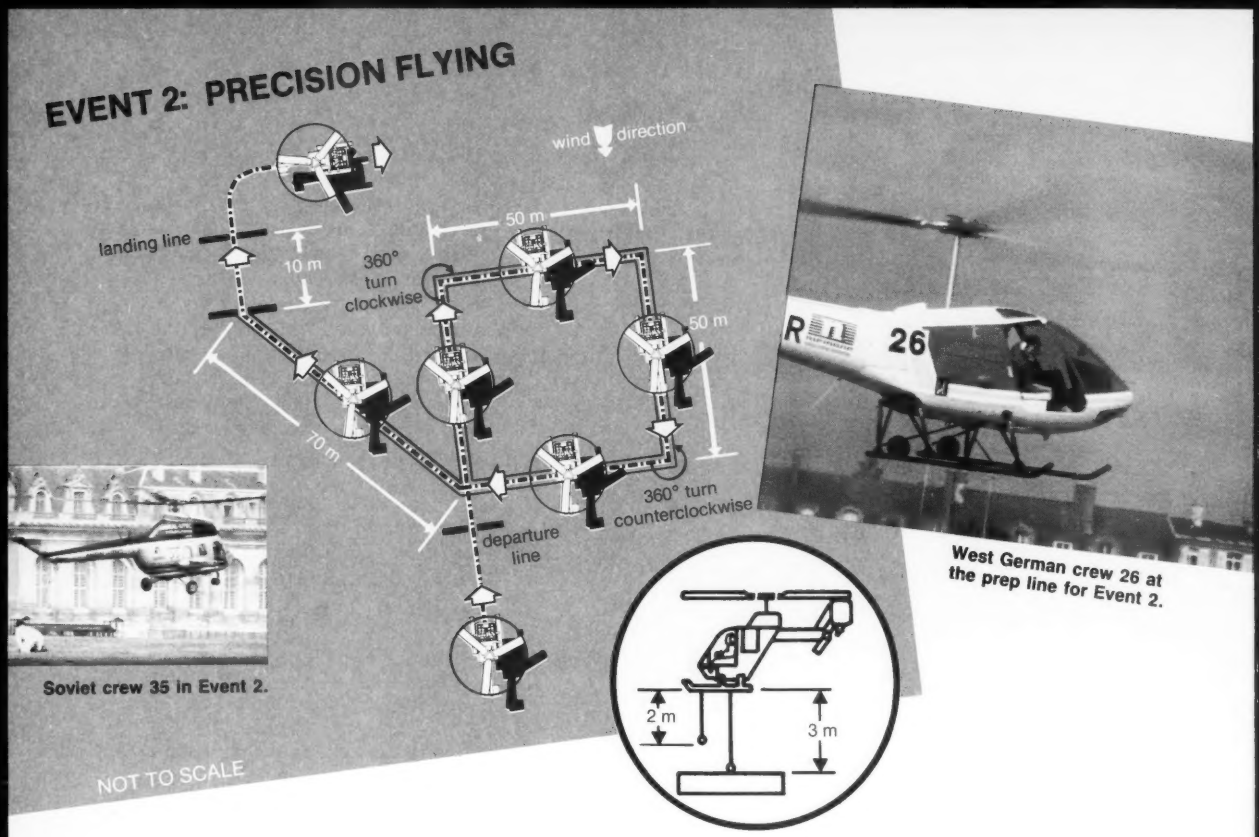
In a staff meeting on 17 January 1989, I learned MG Putnam had been elected president of the Helicopter Club of America, the sponsoring organization of the USPHT. Ms. Jean Tinsley had been appointed the chief judge over the National Championships to be held at Ft. Rucker in March 1989.

MG Putnam understood the importance of the American judging staff and insisted all American judges know the rules thoroughly: Judges must have had a block of instruction on rules and judging standards and have passed an exam on their knowledge; judges must have taken part as a judge in the nationals or in phase competition before being allowed to represent the United States at the WHC. Ms. Tinsley, a charter member of the Whirly Girls, was devoted to the team and considered a good choice for chief judge.

On 2 March 1989, we briefed MG Ellis D. Parker, commander, U.S. Army Aviation Center, Ft. Rucker, AL, on the training status of the team. LTC Harry gently returned fire on some of the doubting directors, and the money we were promised was released for our use. Some serious topics discussed at the briefing included the aircraft (OH-58D or C Kiowa), to be used in the competition, and our allotted flight hours that had been cut from the 2,000 requested to 1,800. MG Parker reinstated our flight hours, and told us he would intervene if there were problems.

The Nationals

The Ft. Rucker trials for the nationals began on Sunday morning, 12 March 1989. LTC Harry hawk-eyed the whole bunch of competitors and, because he



would have the final choice of the crews, put the pressure on by just being there. He had made the decision to post the PT (physical training) scores publicly to add the pressure.

On the morning of Tuesday (14 March), LTC Harry debriefed us on Event 1 from the day before. His method surprised the crews. There was no finger pointing. He asked every crew for specific problems and suggestions. He gave each crewman a chance to speak as long as he needed. The crews discussed problems in the light of the national trials to come up the next week. The feedback was invaluable to the staff. Competitors were safety-conscious, a mark of the current safety trend in the Army and indicative of the Ft. Rucker mind-set on safety.

In the next debriefing (15 March), the commander discussed at length the need to know the rules. All agreed. Not one protest had been filed in the event of the day before. LTC Harry noted that this resulted in a loss in points to two crews. He encouraged the crews to protest, protest, protest.

The Ft. Rucker champions were Mr. Dave Clark and CW3 Sherm Bennett. Presentations were made on 17 March, and LTC Harry conducted an interview with many of the local media.

The Sunday (19 March) inbrief for the national trials went as planned, and the judges' training was excellent. PT testing was on schedule. LTC Harry's remarks received a lot of attention. He commented on how methods of bombing the table with the bucket—one solution in a moment of desperation—had worked and failed—"good luck to those who bomb the table." On another note, ". . .keep your head up. If you have a mid-air on the course, you get a zero for the event. . . ." The latter comment brought the first laughter of the day. The crews were really tense.

The nationals did not go as smoothly as planned. Eventually Event 3 was cancelled because of bad weather, and the other events were worked in as weather permitted. CW4 John Loftice and CW2 Ken Wright, CW2 George Egbert and CW2 Paul Hendricks, and CW3 Ed Jones and CW3 Neil Whigham won 1st, 2d and 3d places, respectively. Other selectees for the team were: CW3 Jon Iseminger and CW3 Rudy Hobbs; CW3 David White and 1LT Jae Collins; CW3 Rick Church and SGT Scott Harbarger; CW3 Howard Fancher and SGT Lonnie Rash; and CW3 Maris Stipnieks and 2LT Brian

Dickens. The awards ceremony was followed by a team inbrief in the afternoon in Building 601.

USPHT Training

On 3 April 1989, LTC Harry changed some of the rules to make the guys stretch. The practice rules now had what he called the "team standard" to set the measure for success. For example:

Event 1:

- The size of the rooftop device hole on one side was reduced to 12 inches, and on the other side, 15 inches.
- The allowed time over the rooftop device without penalty was reduced from 30 to 22 seconds.

Event 2:

- The width of the landing line was reduced from 6 inches to 4 inches.
- For training, the event time was reduced to 2 minutes and 5 seconds.

Event 3:

- The drop target diameter was reduced from 5 meters to 4 meters.
- Each practice required three drop points except fly-offs.

Event 4:

- The tabletop size was reduced to the size of a 55-gallon drum top.
- The course time was kept at 3 minutes, 30 seconds.

These were only a few of the changes. The training was tough from April to August. The phase fly-offs were so challenging that they could not be used to measure the position of the flight crews, and the pace never slowed up. Every day brought something new: another airfield, a change in an event, a change in points given for penalties. Imagine coming to a phase fly-off to find the Event 4 table removed and, in its place, a telephone post. Not straight, not even level, just there, a stump at the end of the slalom event. And so it went. Then on to Belgium. And the pace was faster. More to do, more to learn, less time to do it. Stress showed everywhere. One crew, having forgotten to pick up their drop bags, threw out a pair of boots over the drop circle, for which they were disqualified (DQ'd). But the crews drove on, faster and faster, until WHC finally arrived. I felt it too, everyone's being all keyed up until the last training day. We (the staff) could aim the gun, but we couldn't pull the trigger. All we could do then was watch them.

The World Helicopter Championship

Day 1—7 September 1989. The Long Navigation was run today to take advantage of the good weather. I left Belgium with CPT Delaney at 0530. We arrived in Chantilly around 0745 and went directly to the meeting. The meeting finally started at 0930. The first words out of Mr. Fenwick's mouth pointed out the importance of safety. He reminded us that nothing was more important, and that any individual deliberately doing something unsafe could end up with a DQ.

He described clearly the isolation policy, which was designed to prevent unfair advantage to pilots who had not flown the event. Upon landing, pilots would be directed to parking, greeted by an escorting judge who would take them to isolation. He mentioned the importance of MFOs (mandatory fly-over points), showed us an example of all panels and reviewed the rules.

A question and answer session followed. I have to say that CPT McGrath did an extraordinary job of handling questions for the long navigation event. The mental and physical preparation he endured, over the past 6 months, at the hands of his (tor)mentor, LTC Harry, paid huge benefits for him and for the prowess of the United States in the entire competition. He wore a suit only he could get away with—a tweed jacket and plaid vest with golf shoes and a Scottish hat he kept low on his brow, as though to make a getaway in his Austin-Healy. He took charge at the briefing; he took charge at the course; he ensured that performance by the judges was to standard and that there was no wavering. He played the part to the limit, and absolutely set the standard for all the judges.

Mr. Fenwick finished the discussion and then read off the departure sequence. The meeting ended at 1108. The crews then met at the tent to discuss all changes with LTC Harry. The crews participated in this discussion, and it became a rapid review of all the options they could brainstorm. The commander asked each crew, in turn, to answer a different question; they chewed each question up. They knew every answer; they reviewed other angles of each question. It set the standard for a similar meeting after every brief throughout the competition.

At about 1355 the first aircraft launched. I remained at the Event 3 departure line until after all of the U.S. crews returned. After the event, all the crews went to the tent. All of them except Crew 19 thought they had scored at least 199, and everyone was up! Then we learned that the first panel had blown over, and Crew 19 could not identify the panel though they located it. It turned out that many of the following crews did identify it (including other countries). We might not have protested the penalty, but we found out that one Russian crew arrived at the panel after the U.S. team, and as a courtesy, landed and fixed it! So Crew 19

won another 10 points with their protest.

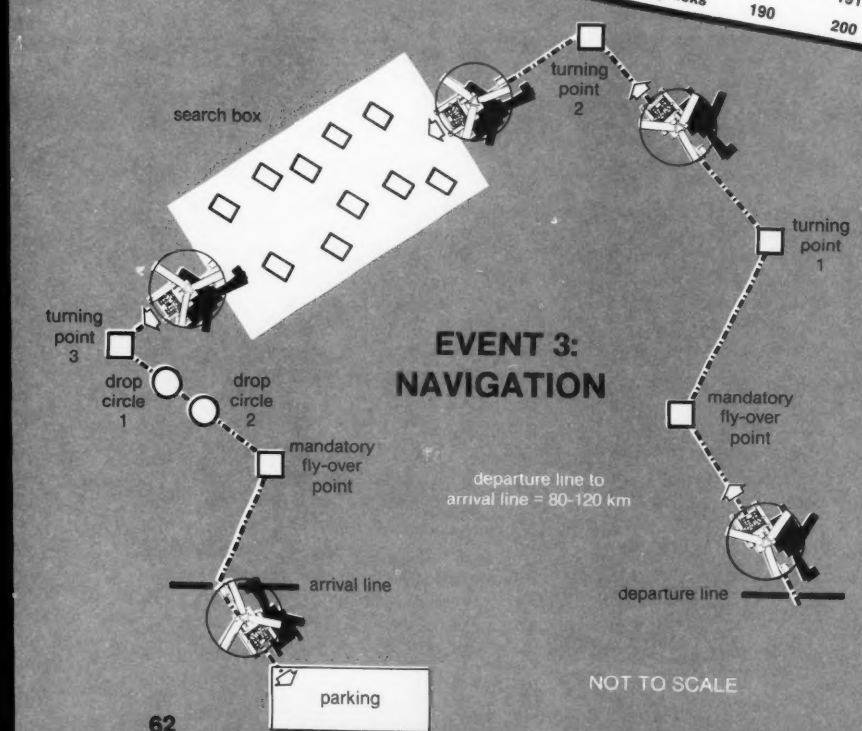
Day 2—8 September 1989. Event 1 meeting opened late again. The organizer, Mr. Fenwick, began the meeting by telling everyone that they did well, and congratulated the Soviets for avoiding a traffic conflict (another aircraft) and successfully completing the mission. That got a round of applause from the competitors, and the friendly attention seemed to warm the Soviets in a pleasant way. Then the Germans extended an invitation to their beer party that evening and more applause.

Mr. Fenwick commented about one of the teams being late that morning, and lectured us to be there, ready and seated at 0730. One of the Brits stood up and began to defend the honor of his countrymen when Mr. Fenwick interrupted him and assured him that, on *this* morning, it wasn't the British who were late. That got a big laugh, and he sat down good naturedly.

Then Mr. Fenwick made an amazing remark to the effect that, if you were going to drink and fly, you should be discreet. LTC Harry stood up and began to chastize him about the comment. Mr. Fenwick turned to the chief judge to ask his opinion. While this was going on in the front of the room, Rick Church, with a big, dumb look on his face, asked loudly how long it took to metabolize one ounce of brake fluid (referring to an often repeated rumor about Russian soldiers' drinking alcohol shipped to their units as brake fluid). The Americans were in stitches, to the obvious dismay of LTC Harry who, while standing at the front of us, could not hear our rude whispers. We were still laughing about it when Mr. Fenwick broke

U.S. INDIVIDUAL RESULTS

PLACE	PILOT	EVENT 1	EVENT 2	EVENT 3	EVENT 4	TOTAL
1	Iseminger	200	199	200	197	796
2	Loftice	199	200	200	194	793
3	Church	199	192	200	195	786
4	Egbert	198	199	200	187	784
5	Jones	200	196	200	185	781
5	Fancher	198	191	199	193	781
7	Stipnieks	190	200	183	198	771



EVENT 3: NAVIGATION

away from that subject and charged into a topic he felt was *really* important: landing on the horse race track.

It was a grass track, the pride of Chantilly, and we were forbidden to land on it. Ever. No one was to land on that race track. Never. Death to the trespasser. No forgiveness. Not in this life or the next. DQ. His only regret was that a DQ was the only penalty for this vile deed. We got the point.

He announced that the results of yesterday's event had been completed and posted. He then went over all changes, one page at a time, to the published rules.

During the brief, I asked Paul Hendricks about the navigation event from yesterday. He stated that it was well laid out, but the course was too easy and could have been flown with 200 point scores the first day of our training. This removed Event 3 (and effectively helped all the weak navigating crews) as a real test in the competition.

LTC Harry asked more questions; then a German asked the definition of "normal copilot sitting position." It would be a crucial point later in the competition. Mr. Fenwick placed a chair upon a table, sat on it and showed us his definition of a "normal position." His demonstration was clear, and there were no questions after he was done.

After the meeting, we all went over to the tent and had another of one of LTC Harry's famous pre-mission briefings. He covered everything he could think of that would be common tasks to the crews, and reminded them of their focus. The scores from the day before were shocking. The United States tied five ways for first place. The event finally launched at 1411 hours. At 1510, en route to the start line, Howard Fancher and Lonnie Rash (Crew 15) got an engine chip light. They landed, another pilot came over and shut the aircraft down, and they ran over to the replacement aircraft. The crewchiefs, SSG Balderama and SSG Henderson, put the competition numbers on the tail and belly of a spare aircraft. The drill to change aircraft ran as smoothly as it could have. Jon Iseminger, the next competitor, came out and went directly from the OGE (out-of-ground effect) area to the start line in Howard's place, and Fancher was back in the OGE area at exactly 1523 hours.

After all the competitors had returned, LTC Harry held another afteraction brief. He warned them that the hover event would be tough, so get ready. He reviewed the problems of the day, the exercise of the emergency aircraft replacement plan, the delays of the event, etc. He told how the crewchiefs had worked out a plan for aircraft number conversion the day before, and how SSG Henderson finally figured out which crew needed the aircraft so he could put on the right competitor number. Henderson looked out and saw two short fellows (Fancher and Rash) trying to scale the 40-inch fence twice. . . each. . . .

LTC Harry: "No one else in the world could have done that- . . .back on the course in 13 minutes. Our nearest competitor took a 65-point hit on the skittle drop. . .he is history." He indicated the crews would have to be upside down in the middle of the course for someone to beat them the next day.

Day 3—9 September 1989. During the Event 2 (hover) brief, Mr. Fenwick expressed concern over this event as the one that placed the judges in closest proximity to the helicopters and, therefore, at the greatest risk. He announced the name of a British judge who would be the chief judge that day—Mr. Ben-Max. MSG Sutton would be the timing judge. Mr. Fenwick then reviewed the rules and a variety of administrative subjects.

The event started around 1300 hours and, at 1335 hours, the course was closed. The judges gathered around the spare U.S. OH- 58 to observe the authorized sitting position of the crews. The first three Russians were DQ'd on

U.S. World Helicopter Championship Team

Back row left to right: CW4 John Loftice, CW2 Kenneth Wright, CW3 Paul Hendricks, CW3 George Egbert, CW3 James Church, SGT Scott Harbarger, CW3 Maris Stipnieks, 1Lt Brian Dickens. Front row left to right: CW3 David White, 1LT Jae Collins, CW3 Howard Fancher, SGT Lonnie Rash, CW3 Jon Iseminger, CW3 Rudolph Hobbs, CW4 Edward Jones, CW3 Neil Whigham

TEAM RESULTS

COUNTRY	POINTS	TEAM MEMBERS
United States	2,733	Iseminger, Loftice, Egbert
Soviet Union	2,202	Derbassov, Korotaev, Stekolnikova
Great Britian	1,746	Campbell, Swales, Hayward
France	1,598	Fourticq, Pescarolo, Durieux
Federal Republic of Germany	1,580	Hanses, Heinrich, Nieman

the course by the illustrious British chief judge Mr. Ben-Max because the copilot did not remain in the rigid upright position. He (the judge) had not understood the definition of "normal position" as Mr. Fenwick had painfully pointed it out that morning and the previous day at the brief. The judge must have slept through the brief, and it caused a stir among the teams. Mr. Fenwick entered the discussion and supported the Russian crews.

During the competition, one of the judges penalized Jon Iseminger for a double set; that is setting one skid and then the other. The protest was filed, but he had to carry this burden into the last day's competition, uncertain of the outcome.

Later that day Howard Fancher sat down and talked with me about the closeness of the crews on this team. We decided the crews were a lot closer than in 1986 for many reasons. LTC Harry had taken a different, more laid back posture. Ed Jones, John Loftice, Ken Wright, Dave White, Lonnie Rash, Scott Harbarger and all the Texas Guard guys had really made a major contribution to the closeness of the crews. Howard Fancher was too modest. He *and* these guys really helped me, making my staff job much easier.

Day 4—10 September 1989. On Sunday Mr. Fenwick began the slalom event briefing by discussing the investigation team. He slammed home the requirement that all judges remain after the crew brief that morning. He specifically forbade any other meetings while he was talking to them, and made it clear there would be no options. Then he required all judges to be in the briefing room after Event 4, which would help the investigation team finish their work.

Event 4 was introduced with correction of the published rules; for example, the bucket quantity was corrected to 8.6 liters. The rope would be held by the crewmember in a "...normal position. That normal position will not be discussed again today! It is the normal position we discussed yesterday!" Applause. All crews were allowed a chance to walk the course before the competition. The red line on the top of the poles didn't mean anything, he said. "It is the judges who cannot see well!" More applause. Mr. Fenwick then gave a severe description of the tabletop work, which amazed even LTC Harry. If a bucket touched the tabletop, it would be counted as a set. It was the only way he felt he could be fair to all.

LTC Harry called a meeting of the pilots after the brief and discussed the importance of a quick start. The crews hung on every word, as though to dredge some magic formula out of anything that might be said.

We next learned that Howard Fancher won his 25-point protest and Rick Church won his 50-point protest. Jon Iseminger was still uncertain of his 25-point protest.

Event 4 started at 1345. I went out to the course and watched with Ivy Loftice and her son as John Loftice (Crew No. 12) had what appeared to be a perfect set on the table. We all cheered, and Ivy burst into tears. It was a tremendous emotional moment, and we were all caught up in it . . .a sudden release of the tension and stress built up over 6 months of family separations,

World helicopter champions over the table in Event 4.

The author with Watalia Varicheva, a Soviet judge.

*U.S. G.P.O. 1990-731-035:20002

long hours and never-ending pressure. It was a half-hour later when I learned that our perspective of the table was bad, the set was not good and cost him 6 points. Jon Iseminger came up to the table and had a nearly perfect set.

It now appeared that, if Jon Iseminger won his 25 points, he would be the world champion, again. The stress was gone for the rest of us. A pretty reporter approached Rick Church of Crew 14, who took 3d place in this WHC, for an interview. His navigator, Scott Harbarger, passed by and yelled for all to hear ". . . and he is NOT a space shuttle pilot. . .!"

At 1840 still no word had been received about Jon Iseminger's protest. The crews had gone to the celebration tent or back to the hotel. I stayed down at the tent, guarding our gear. I sat there alone, pondering the weight of the burden, which was now past. Being one of the Belgium staff, I was not invited to attend the banquet. It was over. I tried hard to stop my racing mind, to enjoy just sitting. It was the first time in 6 months I didn't have something urgent to do.

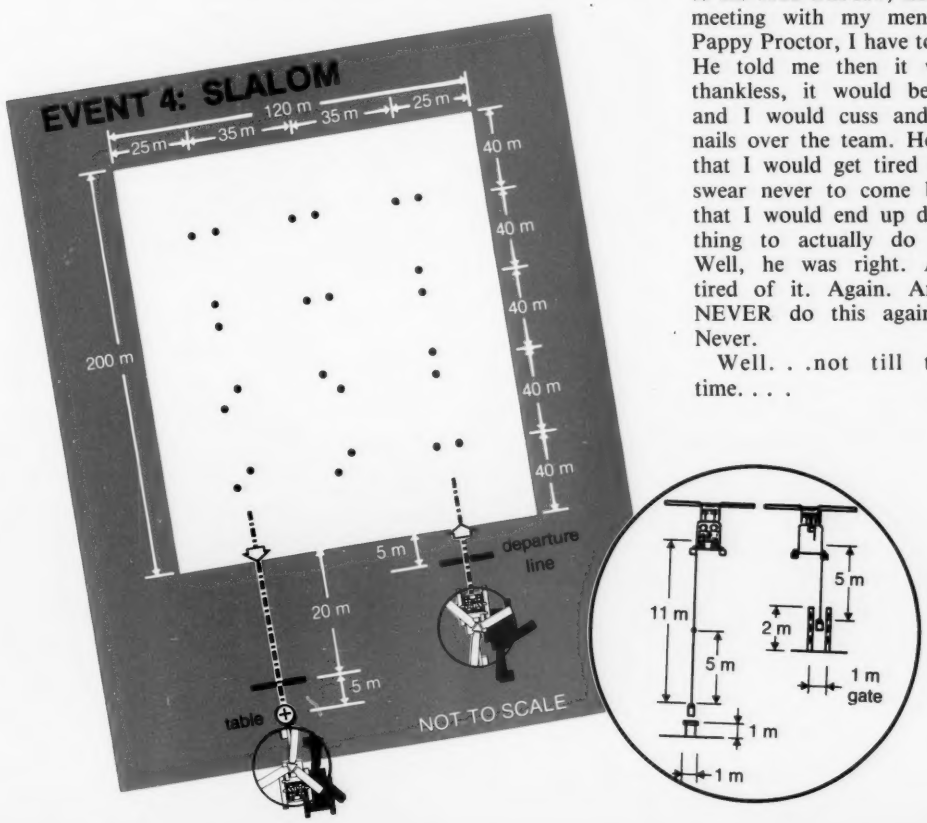
That night, recognition was made of the official scores, and each country's national anthem was partially played. Individual winners were called up and introduced. The United States took first place with 2,373 points out of 2,400 possible. The Soviet Union was second place with 2,202 points, followed by third place Great Britain with 1,746 points. France was recognized with 1,598 points and Germany with 1,580 points.

I got back to the "gulag" (our very humble barracks in Belgium) around 2200 hours, sneaked across the street to the local tavern and ordered the biggest two meals they had. I ate them both. Then I went to my room and slept for 12 hours.

Jon Iseminger did win his points, and was crowned the World Champion for the second time. Against all odds, even with the uncertainty of the last penalty and protest, Jon hung in and won it all.

There are a lot of things I haven't told you. More of them were difficult than I care to mention, but we did it. Again. When I think back to my introduction to the 1986 USPHT, and my first meeting with my mentor CW4 Pappy Proctor, I have to chuckle. He told me then it would be thankless, it would be difficult and I would cuss and bite my nails over the team. He told me that I would get tired of it and swear never to come back, but that I would end up doing anything to actually do it again. Well, he was right. And, I'm tired of it. Again. And I will NEVER do this again! Never! Never.

Well. . .not till the next time. . . .



USAASO SEZ

U.S. Army Aeronautical Services Office

DIRECT USER ACCESS TERMINAL SERVICE

Mr. Terry L. Van Steenbergen
U.S. Army Aeronautical Services Office
Cameron Station, Alexandria, VA

THE FEDERAL Aviation Administration (FAA) has requested that Army aviators be informed about using the military Direct User Access Terminal Service (DUATS). DUATS is a system for aviators in the contiguous 48 States. These aviators have a U.S. Airman's Certificate and a current FAA medical examination filed with the FAA records center in Oklahoma City, OK.

These documents allow these aviators to obtain a weather briefing and file civil flight plans under visual flight rules and instrument flight rules without contacting a flight service station. DUATS is designed to work with most computers equipped with a modem and a communication program. A DUATS session, limited to 20 minutes, is free from the following locations—

Contel Federal Systems
12015 Lee Jackson Highway
Fairfax, VA 22033
800-345-3828

Data Transformation Corporation
559 Greentree Road
Turnerville, NJ 08012
800-243-3828

Lockheed Dataplan, Incorporated
121-A Albright Way
Los Gatos, CA 95030
800-767-3828

The FAA informs Army aviators of DUATS program facets that negatively impact on the Army user. (1) The Army user must have a civil U.S. pilot certificate and a current FAA physical. Without the certificate and physical, all aviators are denied access to the DUAT service. (2) Army aviators cannot receive a complete weather briefing if filed to a military airfield, because military airfield weather and notices to airmen are not part of the DUAT service. (3) The DUAT service is not formatted to send flight notification messages required for military flights. Items 2 and 3 also affect flying clubs and contractors who operate at, depart from or arrive to military airfields.

Many Army aviators have the credentials needed to access and use the DUAT system as an alternative method of weather briefing during their flying activities. Also, the DUAT service can help Reserve Components and Army National Guard units operating from civil airports.

Here are steps to run a sample session and register with the system—

- Have flight plan ready (civil airport to civil airport).
- Have your pilot certificate number available.
- Be prepared to record your registration number and password where you can find them during flight.
- Prepare the communication package to transfer a session to a file you can look at when the computer is off line.
- Type a question mark and follow the prompts when you use DUATS.

DUATS is one of many new initiatives designed by civilian aviation. DUATS intends to automate flight planning and decrease present labor intensive and costly manual operations of the National Airspace System (NAS). This service directly affects the military aviation community. Aviators must know these systems as they fly in the NAS. Also, they must prepare to take advantage of a blending of automated and aviation services that will be standard in the near future.